

SEPTEMBER, 1927

25 Cents a Year

Contractors *and* Engineers Monthly

62
THE
JOHN CRANE



Upsetting High Concrete Pier
Forms at New Jersey Approach of
the Howland Hook-Elizabeth Bridge

The finest product of our 25 years' experience~

Here is the ideal bucket for contractors. It has weight enough to bury itself in the material, spread enough to collect a full bucket load and speed enough to insure at least three trips a minute . . . a bucket suitable for locomotive crane or derrick operation.

The New ORTON Clamshell Bucket has flat braced back arms, straight lead cable sheaves, bronze-bushed interlocking hinges, Alemite-Zerk Lubricating System and many other improvements in design and construction.

This New Bucket is the finest product of our twenty-five years' experience. Its principles of construction have been proven sound and a long list of satisfied users vouch for its dependability. Contractors everywhere are using this New ORTON Bucket.

We shall be glad to send complete information, including photographs, descriptive literature and price of any size bucket we manufacture, to anyone interested. The ORTON Clamshell is built in sizes from 1/2 to 5 yards.



This is the New ORTON 1/4-yard clamshell bucket. Note the new flat braced back arms, the interlocking hinges and its sturdy appearance in general. It is especially suitable for cleaning up cars because it has straight sides and back. Write now for our new folder describing it.

Cranes **ORTON** Shovels
ORTON CRANE & SHOVEL COMPANY, 608 SO. DEARBORN ST., CHICAGO, ILL.

VOL. XV. No. 3 CONTRACTORS AND ENGINEERS MONTHLY, September, 1927 Price, 25 Cents; \$1 a Year
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Where to Purchase

A comprehensive classification of the leading machinery and supply manufacturers arranged for the convenience of contractors, engineers and public officials who may wish to secure information about construction equipment. The Index to Advertisers faces the inside back cover. When writing to advertisers please mention the **CONTRACTORS' & ENGINEERS' MONTHLY**. A star (*) before the manufacturer's name indicates that his advertisement appears in this issue.

This index is published as an aid to the reader, but the publishers assume no responsibility for errors or omissions.

AERIAL WIRE ROPE TEAMWAYS

- *Amer. Steel & Wire Co., Chicago
- Broderick & Bascom Rope Co., St. Louis
- Hazard Mfg. Co., Wilkesbarre, Pa.
- A. Leachen & Sons Rope Co., St. Louis

AIR COMPRESSORS

- *American Steam Pump Co., Battle Creek, Mich.
- *Buhl Co., Chicago
- *Cement-Gun Co., Allentown, Pa.
- *Cook Motor Co., Delaware, O.
- *Denver Rock Drill Mfg. Co., Denver
- *Domestic Eng. & Pump Co., Shippensburg, Pa.
- *Nove Engine Co., Lansing, Mich.
- *O. K. Clutch & Mach. Co., Columbia, Pa.
- *Stover Mfg. & Eng. Co., Freeport, Ill.
- *Sullivan Mch. Co., Chicago
- Allis-Chalmers Mfg. Co., Milwaukee.
- Barnes Mfg. Co., Mansfield, O.
- Chicago Pneumatic Tool Co., N. Y.
- Curtis Pn. Mch. Co., St. Louis, Mo.
- De Laval Stm. Turb. Co., Trenton, N. J.
- Fairbanks, Morse & Co., Chicago.
- Gardner Governor Co., Quincy, Ill.
- General Elec. Co., Schenectady, N. Y.
- Hardie-Tyres Mfg. Co., Birmingham, Ala.
- Independent Pneum. Tool Co., Chicago.
- Indiana Air Pump Co., Indianapolis, Ind.
- Ingersoll-Rand Co., N. Y.
- Nordberg Mfg. Co., Milwaukee.
- Norwalk Ir. Wks. Co., So. Norwalk, Ct.
- Schramm, Inc., West Chester, Pa.
- United Iron Wks., Kans. City, Mo.
- Westinghouse Trac. Brake Co., Wheeling, Pa.
- Worthington Pump & Mch. Corp., N. Y.

AIR COMPRESSORS, PORTABLE

- *Domestic Engine & Pump Co., Shippensburg, Pa.
- Ingersoll-Rand Co., N. Y.

ARC LAMPS

- General Elec. Co., Schenectady, N. Y.
- Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

ARTESIAN WELL DRILLS & PUMPS

- *Star Drilling Mach. Co., Akron, O.
- Am. Well Works, Aurora, Ill.
- Ingersoll-Rand Co., New York.

ASBESTOS PRODUCTS

- *Phillip Carey Co., Cincinnati.
- Keasbey & Mattison Co., Ambler, Pa.
- Mikesell Bros. Co., Wabash, Ind.
- Norristown Mag. & Ash. Co., Norristown, Pa.
- Sall Mountain Co., Chicago.

ASH HANDLING MACHINERY

- *Byers Mach. Co., Ravenna, O.

- *Chain Belt Co., Milwaukee.
- *Chicago Automatic Conv. Co., Chicago.
- *Erie Steam Shovel Co., Erie, Pa.
- *Geo. Haiss Mfg. Co., N. Y.
- *Mack Trucks, Inc., N. Y.
- *Lakewood Eng. Co., Cleveland, O.
- *Link-Belt Co., Chicago
- *Mead-Morrison Mfg. Co., E. Boston, Mass.
- *Orton Crane & Shovel Co., Chicago.
- Atia-Corp., New York.
- C. O. Bartlett & Snow Co., Cleveland, O.
- Brown Hoisting Mach. Co., Cleveland, O.
- Gifford-Wood Co., Hudson, N. Y.
- Green Eng. Co., E. Chicago, Ind.
- Jeffrey Mfg. Co., Columbus, O.
- Portable Mach. Co., Clifton, N. J.
- Robins Conv. Belt Co., N. Y.
- Jas. B. Seaverns Co., Batavia, Ill.
- Webster Mfg. Co., Chicago.
- Weller Mfg. Co., Chicago.

ASPHALT

- *Barber Asphalt Co., Philadelphia.
- *Barrett Co., N. Y.
- *Standard Oil Co. (Ind.), Chicago.
- *Standard Oil Co. (N. Y.), N. Y.
- *Warren Bros. Co., Boston.
- Atlantic Ref. & Asph. Corp., Phila.
- Gulf Refining Co., Pittsburgh.
- Ky. Rock Asph. Co., Louisville, Ky.
- National Rk. Asph. Corp., Owensboro, Ky.
- New Orleans Ref. Co., New Orleans.
- Pioneer Asph. Co., Lawrenceville, Ill.
- Sinclair Ref. Co., Chicago.
- Standard Oil Co. of Cal., S. Francisco.
- Standard Oil Co. of La., N. Orleans.
- Standard Oil Co. of N. J., Newark.
- Texas Co., N. Y.

ASPHALT BLOCK

- Hastings Pavement Co., N. Y.

ASPHALT BRICK

- Asphalt Brick Co., St. Louis.

ASPHALT CUTTERS

- *Denver Rock Drill Mfg. Co., Denver
- *Littleford Bros., Cincinnati.
- *Sullivan Machinery Co., Chicago.
- Chicago Pneumatic Tool Co., N. Y.
- Cleveland Rock Drill Co., Cleveland, O.
- Dayton Pneum. Tool Co., Dayton, O.
- Independent Pn. Tool Co., Chicago, Ill.
- Ingersoll-Rand Co., N. Y.

ASPHALT KETTLES (See Kettles for Asphalt and Tar Heating)

ASPHALT PLANTS, TOOLS, ETC.

- *Aeroll Burner Co., West New York, N.J.
- *Barber Asphalt Co., Philadelphia.
- *Littleford Bros., Cincinnati, O.
- *Warren Bros. Co., Boston.

- American Fin-Mix Co., Chicago, Ill.
- Chausse Oil Burner Co., Elkhart, Ind.
- F. D. Cummer & Son Co., Cleveland, O.
- J. D. Farasey Mfg. Co., Cleveland, O.
- Hetherington & Berner, Indianapolis.
- Hauk Mfg. Co., Bklyn, N. Y.
- Merriman Asphalt Plant, Inc., Lima, O.
- Mosher Mfg. Co., Chicago, Ill.

ASPHALT ROLLERS (See Road Rollers)

ASPHALT SURFACE HEATERS

- *Aeroll Burner Co., West New York, N.J.
- *Barber Asphalt Co., Philadelphia.
- Chausse Oil Burner Co., Elkhart, Ind.
- Equitable Asp. Maint. Co., Kan. C., Mo.
- Good Roads Equip. Corp., Phila.
- Hauk Mfg. Co., B'klyn, N. Y.

BACKFILLERS

- *Baker Mfg. Co., Springfield, Ill.
- *Bay City Dredge Wks., Bay City, Mich.
- *Buckeye Trac. Ditcher Co., Findlay, O.
- *Byers Machine Co., Ravenna, O.
- *Erie Steam Shovel Co., Erie, Pa.
- *Koebering Co., Milwaukee, Wis.
- *Link-Belt Co., Chicago.
- *Miami Trailer-Scraper Co., Troy, O.
- *Orton Crane & Shovel Co., Chicago.
- *Parsons Co., Newton, Ia.
- *Speeder Mch. Corp., Cedar Rapids, Ia.
- *Star Drilling Mach. Co., Akron, O.
- *Waterman Corp., Detroit.
- Austin Mach. Corp., Muskegon, Mich.
- Construction Mch. Co., Waterloo, Ia.
- Erted Mch. Co., Portland, Ore.
- Harnischfeger Corp., Milwaukee, Wis.
- Lessman Loader Mfg. Co., Des Moines
- Weller Mfg. Co., Chicago.

BAGS

- *Bates Valve Bag Co., Chicago.

BAR BENDERS AND CUTTERS

- *Koebering Co., Milwaukee, Wis.
- *Ransome Conc. Mch. Co., Dunellen, N.J.
- Buffalo Forge Co., Buffalo, N. Y.
- Concrete Steel Co., N. Y.
- Electric Welding Co., Pittsburgh.
- D. A. Hinman & Co., Sandwich, Ill.
- J. L. Gleason & Co., Boston, Mass.
- McKenna Co., Cleveland, O.

BAR CHAIRS, REINFORCING

- *Trusco Steel Co., Youngstown, O.
- Concrete Steel Co., N. Y.
- Universal Form Clamp Co., Chicago.

BAR TIES

- *Bates Valve Bag Co., Chicago.

BATCH BOXES

- *Easton Car & Const'n. Co., Easton, Pa.
- *Heitzel Stl. Form & Ir. Co., Warren, O.

For Leading Local Distributors of Contractors' Equipment in Each State, See Directory on page 169 to 205.

Where to Purchase

- *Jos. Henhorst Co., Cincinnati
 *Lakewood Eng. Co., Cleveland, O.
 *Littleford Bros., Cincinnati.
 Easton Car & Const'n. Co. of Mo.,
 Kansas City, Mo.
 Erie Steel Const. Co., Erie, Pa.
 Koppel Ind. Car & Equip. Co., Koppel,
 Pa.
 Jas. B. Seaverns Co., Batavia, Ill.
 Western Wheeled Scraper Co., Aurora,
 Ill.
- BEARINGS**
 Fafnir Bearing Co., New Britain, Conn.
 Hyatt Roller Bear. Co., Harrison, N. J.
 New Departure Mfg. Co., Bristol, Conn.
 S. K. F. Industries, New York.
 Timken Roller Bearing Co., Canton, O
- BINS, STORAGE**
 *Austin-Western Rd. Mach. Co., Chicago.
 *Blaw-Knox Co., Pittsburgh, Pa.
 *Easton Car & Const'n. Co., Easton, Pa.
 *Gallon Iron Wks. & Mfg. Co., Gallon, O.
 *Good Roads Mch. Co., Kennett Sq., Pa.
 *Helselt Stl. Form & Ir. Co., Warren, O.
 *Link-Belt Co., Chicago.
 *Ransome Conc. Mch. Co., Dunellen, N.J.
 *Russell Grader Mfg. Co., Minneapolis.
 Austin Mfg. Co., Chicago.
 Birmingham Tank Co., Birmingham, Ala.
 Brown Hoisting Mch. Co., Cleveland.
 Butler Bin Co., Waukesha, Wis.
 Canton Art Metal Co., Canton, O.
 Erie Steel Const. Co., Erie, Pa.
 Fairfield Eng. Co., Marion, O.
 Pittsburgh-Des Moines Steel Co., Pitts-
 burgh, Pa.
 Jas. B. Seaverns Co., Batavia, Ill.
 Universal Rd. Mach. Co., Kingston, N.Y.
 Weller Mfg. Co., Chicago.
- BLADES FOR GRADERS & SNOW
 PLOWS**
 *Gallon Iron Wks. & Mfg. Co., Gallon, O.
 *Russell Grader Mfg. Co., Minneapolis.
 J. D. Adams & Co., Indianapolis.
 Shunk Mfg. Co., Bucyrus, O.
- BLAST HOLE DRILLING MACHINES
 (See Well Drilling and Blast Hole
 Machines)**
- BLASTING ACCESSORIES**
 E. I. du Pont de Nemours & Co., Wil-
 mington.
 Hercules Powder Co., Wilmington.
- BLASTING POWDER (See Explosives)**
- BLOCKS AND TACKLE**
 *Boston & Lockport Blk. Co., E. Boston,
 Mass.
 *Dobbie Fdry. & Mach. Co., Niagara
 Falls, N. Y.
 *Western Block Co., Lockport, N. Y.
- BLOW TORCHES**
 *Everhot Mfg. Co., Maywood, Ill.
- BLUE PRINT MACHINES**
 Paragon Mach. Co., Rochester, N. Y.
 O. F. Pease Co., Chicago.
 Wickes Bros., Saginaw, Mich.
- BODIES; SPECIAL FORD**
 Anthony Co., Stretor, Ill.
 Standard Comm. Body Corp., B'klyn.
- BOILERS**
 *Johnston Bros., Inc., Ferrysburg, Mich.
 Chandler & Taylor Co., Indianapolis.
 Chatta. Boiler & Tank Co., Chatta., Tenn.
 R. D. Cole Mfg. Co., Newman, Ga.
 Combustion Eng. Corp., N. Y.
 Erie City Iron Wks., Erie, Pa.
 Hartley Blr. Wks. Montgomery, Ala.
 Heine Boiler Co., St. Louis, Mo.
 E. Keeler Co., Williamsport, Pa.
 Ladd Water Tube Blr. Co., P'tsbgrh, Pa.
 V. Leffel & Co., Springfield, O.
 Lord & Burnham Co., Irvington, N. Y.
- Murray Iron Wks. Co., Burlington, Ia.
 Nagle Eng. & Blr. Wks. Erie, Pa.
 New Bern Iron Wks. & Sup. Co., New
 Bern, N. C.
 Petroleum Iron Wks. Co., Sharon, Pa.
 J. S. Schofield's Sons Co., Macon, Ga.
 Stanwood Corp., Cincinnati, O.
 Superior Body Corp., Marion, Ind.
 Vogt Mch. Co., Inc., Louisville, Ky.
 Walsh & Weidner Blr. Co., Chattanooga,
 Tenn.
- BRACES, TRENCH**
 *Templeton, Kenly & Co., Chicago
 *Williams Natl. Form Clamp Co., Ch'go.
 Jas. H. Channon Mfg. Co., Chicago.
 Duff Mfg. Co., Pittsburgh, Pa.
 Kalamazoo Fdry. & Mach. Co., Kala-
 mazoo, Mich.
 Waldo Bros. & Bond Co., Boston.
- BRANDING TOOLS**
 *Everhot Mfg. Co., Maywood, Ill.
- BRASS GOODS**
 *Union Water Meter Co., Worcester, Mass.
 Glauber Brass, Mfg. Co., Cleveland, O.
 Haydenville Co., Haydenville, Mass.
 Hays Mfg. Co., Erie, Pa.
 Mueller Company, Decatur, Ill.
 United-Ohendorf Corp., Cleveland, O.
- BREAKERS, CONCRETE**
 *Buckeye Trac. Ditcher Co., Findlay, O.
 *Denver Rock Drill Mfg. Co., Denver
 *Hardsceg Wonder Drill Co., Ottumwa, Ia.
 *Sullivan Machy. Co., Chicago
 *Chicago Pneumatic Tool Co., N. Y.
 *Cleveland Rock Drill Co., Cleveland, O.
 Independent Pa. Tool Co., Chicago.
 Ingersoll-Rand Co., N. Y.
- BRICK, PAVING (See Paving Brick)**
- BRICK CLEANING MACHINES**
 Elgin Gas Motor Co., Elgin, Ill.
 Rotor Air Tool Co., Cleveland.
- BRIDGES, CONCRETE**
 *Frederick Snare Corp., New York
- BRIDGES AND BUILDINGS, STEEL**
 *Blaw-Knox Co., Pittsburgh, Pa.
 *Frederick Snare Corporation, N. Y.
 American Bridge Co., N. Y.
 Bellefontaine Br. & Stl. Co., Belle-
 fontaine, O.
 Belmont Iron Wks., Phila.
 Berlin Constr. Co., Berlin, Conn.
 Bethlehem Steel Co., Bethlehem, Pa.
 Boston Bridge Wks., Boston.
 Central States Br. Co., Ind'polis, Ind.
 Champion Bridge Co., Wilmington, O.
 Chesapeake Ir. Wks., Baltimore, Md.
 Clinton Bridge Wks., Clinton, Ia.
 Eastern Bridge & Struc. Co., Worces-
 ter, Mass.
 Flour City Orn. Iron Co., Minneapolis.
 Fort Pitt Br. Wks., Pittsburgh, Pa.
 Hughes-Keenan Co., Mansfield, O.
 Ingalls Ir. Wks. Co., Birmingham, Ala.
 Inter. Stl. & Ir. Co., Evansville, Ind.
 Lakeside Br. & St. Co., No. Milwaukee.
 Louisville Br. & Ir. Co., Louisville, Ky.
 McClintic Marshall Co., Pittsburgh, Pa.
 Milwaukee Br. Co., Milwaukee, Wis.
 Minn. Stl. & Mch. Co., Minneapolis.
 Missouri Vy. Br. & Ir. Co., Leaven-
 worth, Kan.
 Mt. Vernon Br. Co., Mt. Vernon, O.
 Penn. Bridge Co., Beaver Falls, Pa.
 Pittsburgh-Des Moines Stl. Co., Pitts-
 burgh, Pa.
 Richmond Struc. Stl. Co., Richmond,
 Va.
 Riverside Br. Co., Martins Ferry, O.
 Virginia Br. & Ir. Co., Roanoke, Va.
 Wisc. Br. & Ir. Co., No. Milwaukee, Wis.
- BROWN TABLETS**
 Flour City Orn. Ir. Co., Minneapolis.
 Imperial Brass Mfg. Co., Chicago.
 J. L. Mott Iron Wks., N. Y.
- BROOMS (See Street Sweeping Brooms)**
- BUCKETS, AUTOMATIC DUMPING**
- *Lakewood Eng. Co., Cleveland, O.
 *Union Iron Wks., Inc., Hoboken, N. J.
 G. L. Steubner Ir. Wks., Inc., Long
 Island City, N. Y.
- BUCKETS, CLAM SHELL**
 *Blaw-Knox Co., Pittsburgh, Pa.
 *Geo. Haiss Mfg. Co., N. Y.
 *J. F. Kiesler Co., Chicago
 *Lakewood Eng. Co., Cleveland, O.
 *Link-Belt Co., Chicago.
 *Mead-Morrison Mfg. Co., E. Boston, Mass.
 *Orton Crane & Shovel Co., Chicago.
 Brown Hoisting Mach. Co., Cleveland, O.
 Buffalo Hst. & Der. Co., Buffalo, N. Y.
 Browning Crane Co., Cleveland, O.
 F. A. Coleman Co., Cleveland, O.
 Erie Steel Const. Co., Erie, Pa.
 Hayward Co., N. Y.
 Industrial Wks., Bay City, Mich.
 McMyler Interstate Co., Cleveland, O.
 Owen Bucket Co., Cleveland, O.
 Page Eng. Co., Chicago
 G. H. Williams Co., Erie, Pa.
- BUCKETS, CONCRETE**
 *Insley Mfg. Co., Indianapolis, Ind.
 *Lakewood Eng. Co., Cleveland, O.
 *Ransome Conc. Mch. Co., Dunellen,
 N. J.
 *Union Iron Works, Inc., Hoboken, N. J.
 Koppel Ind. Car & Equip. Co., Koppel, Pa.
 G. L. Steubner Ir. Wks., Inc., Long
 Island City, N. Y.
- BUCKETS, DRAGLINE**
 *Dobbie Fdry. & Mch. Co., Niagara
 Falls, N. Y.
 *Gallon Ir. Wks. & Mfg. Co., Gallon, O.
 *Link-Belt Co., Chicago.
 *Russell Grader Mfg. Co., Minneapolis
 *Satterman Bros., Chicago.
 Reach Mfg. Co., Charlotte, Mich.
 R. H. Beaumont Co., Philadelphia
 Monighan Mach. Co., Chicago.
 Page Eng. Co., Chicago.
 Pioneer Bucket Co., Indianapolis, Ind.
- BUCKETS, DREDGING AND EXCA-
 VATING**
 *Blaw-Knox Co., Pittsburgh, Pa.
 *Geo. Haiss Mfg. Co., N. Y.
 *J. F. Kiesler Co., Chicago.
 *Lakewood Eng. Co., Cleveland, O.
 *Link-Belt Co., Chicago.
 *Mead-Morrison Mfg. Co., E. Boston, Mass.
 *Orton Crane & Shovel Co., Chicago.
 Brown Hoisting Mach. Co., Cleveland, O.
 Browning Crane Co., Cleveland, O.
 Hayward Co., N. Y.
 Owen Bucket Co., Cleveland, O.
 G. H. Williams Co., Erie, Pa.
- BUCKETS, ORANGE PEEL**
 *J. F. Kiesler Co., Chicago.
 *Link-Belt Co., Chicago.
 *Mead-Morrison Mfg. Co., E. Boston, Mass.
 *Orton Crane & Shovel Co., Chicago.
 Hayward Co., N. Y.
 Industrial Wks., Bay City, Mich.
 McMyler Interstate Co., Cleveland, O
- BUILDING FORMS (See Forms, Conc.)**
- BUILDING, STEEL (See Bridges)**
- BULLDOZERS**
 *LaPlant-Chaste Mfg. Co., Cedar Rapids,
 Iowa
- BUNKS AND COTS**
 Ft. Pitt Bedding Co., Pittsburgh, Pa.
 Haggard & Marcussen Co., Chicago.
 Southern Rome Co., Baltimore, Md.
- CABLES (See Wire and Cable)**
- CABLEWAY, DRAGLINE**
 *S. Flory Mfg. Co., Bangor, Pa.
 *Link-Belt Co., Chicago.
 *Mead-Morrison Mfg. Co., E. Boston, Mass.
 *Russell Grader Mfg. Co., Minneapolis.
 *Satterman Bros., Chicago.
 Street Bros. Mach. Wks., Chattanooga.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

CONCRETE ROADS REINFORCED ARE BEST



Concrete has great compressive strength. It is durable. It is non-slippery. It is comparatively low in cost. Its only drawback is its low tensile strength.



Truscon Welded Steel Fabric has high tensile strength and excellent bonding qualities. It is easy to handle and place. It is comparatively inexpensive.



The two combined result in permanent highways that are economical in first cost and low in maintenance cost.

You'll find the complete story in our new handbook, MODERN ROAD CONSTRUCTION. Write for your copy. It's free.

TRUSCON

TRUSCON STEEL CO.,
YOUNGSTOWN, O.
Established 1903

Warehouses and Offices in all Principal Cities

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

TRUSCON PRODUCTS FOR REINFORCING ROADS AND PAVEMENTS



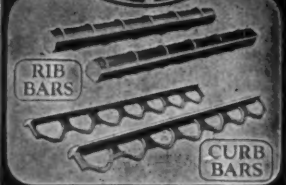
WELDED STEEL FABRIC



CONTRACTION JOINTS



STEEL ROAD FORMS



RIB BARS

CURB BARS



EXPANDED METAL

Welded Steel Fabric for Permanency
Contraction Joints for Safety
Steel Road Forms for Economy
Rib Bars for Reinforcing
Curb Bars for Protection

Where to Purchase

CABS FOR MOTOR TRUCKS

Highland Body Mfg. Co., Cincinnati, O.
Weatherproof Body Corp., Corunna, Mich.

CAISSONS

American Bridge Co., N. Y.
Biggs Boiler Wks., Akron, O.
Birmingham Tank Co., Birmingham, Ala.
Foundation Co., N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
O'Rourke Eng. Constr. Co., N. Y.
Petroleum Ir. Wks. Co., Sharon, Pa.

CALCIUM CHLORIDE FOR ROADS

*Dow Chemical Co., Midland, Mich.
*Solway Sales Corp., New York
Carbondale Calcium Co., Carbondale, Pa.

CANS FOR GARBAGE AND REFUSE

American Can Co., N. Y.
Butler Mfg. Co., Minneapolis, Minn.
Canton Art Metal Co., Canton, O.
Economy Baler Co., Ann Arbor, Mich.
Rochester Can Co., Rochester, N. Y.
Solar Sturges Mfg. Co., Melrose Pk., Ill.
Steel Basket Co., Cedar Rapids, Ia.

CAR UNLOADERS (See Loaders)

CARS, INDUSTRIAL V. DUMPING

*Easton Car & Const. Co., Easton, Pa.
*Inley Mfg. Co., Indianapolis, Ind.
*Lakewood Eng. Co., Cleveland, O.
Atlas Car & Mfg. Co., Cleveland, O.
Austin Mfg. Co., Chicago
Chase Fdry. & Mfg. Co., Columbus, O.
C. W. Hunt Co., W. New Brighton, N.Y.
Koppel Ind. Car & Equip. Co., Koppel, Pa.
G. L. Stuehner Ir. Wks., Inc., Long Island City, N. Y.
United Ir. Wks. Inc., Kans. City, Mo.
Weller Mfg. Co., Chicago.
Whiting Corp., Harvey, Ill.

CARTS, CONCRETE

*Easton Car & Const. Co., Easton, Pa.
*General Wheelbarrow Co., Akron, O.
*Inley Mfg. Co., Indianapolis, Ind.
*Lakewood Eng. Co., Cleveland, O.
*Ransome Conc. Mch. Co., Dunellen, N.J.
*Sterling Wheelbarrow Co., Milwaukee
*Toledo Wheelbarrow Co., Toledo, O.
*Chattanooga Wheelbarrow Co., Chattanooga, Tenn.
Cleveland Wheelbarrow Co., Cleveland, O.
E. D. Etnyre & Co., Oregon, Ill.
Gray Iron Fdry. Co., Reading, Pa.
Jackson Mfg. Co., Harrisburg, Pa.
Lansing Co., Lansing, Mich.
Lee Trailer & Body Co., Plymouth, Ind.

CAST IRON PIPE (See Pipe, Cast Iron)

CASTINGS, STREET AND SEWER

*Central Fdry. Co., N. Y.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*U. S. Cast Ir. Pipe & Fdry. Co., Burlington, N. J.
Burch Corp., Crestline, O.
Canton Fdry. & Mach. Co., Canton, O.
Casey-Hedges Co., Chattanooga, Tenn.
H. W. Clark Co., Matteson, Ill.
J. B. Clow & Sons, Chicago.
W. E. Dee Co., Chicago.
Elkhart Fdry. & Mach. Co., Elkhart, Ind.
Gilbert Mfg. Co., Aberdeen, S. Dak.
Klauser Mfg. Co., Dubuque, Ia.
Madison Fdry. Co., Cleveland, O.
Pechstein Iron Works, Kookuk, Ia.
Sessions Foundry Co., Bristol, Conn.
South Bend Fdry. Co., So. Bend, Ind.

CATCH BASINS (See Castings, Street)

CATCH BASIN CLEANING OUTFITS

*Mack Trucks, Inc., N. Y.
Atia Corp., N. Y.
Elgin Sales Corp., N. Y.
Movakam Co., Indianapolis, Ind.

CAULKING MACHINERY AND TOOLS

Cleveland Rock Drill Co., Cleveland, O.
Helwig Mfg. Co., St. Paul, Minn.

Independent Pn. Tool Co., Chicago.
Ingersoll-Rand Co., N. Y.
Mueller Company, Decatur, Ill.

CEILINGS, METAL

Berger Mfg. Co., Canton, O.
Canton Art Metal Co., Canton, O.
Globe Iron Roofing & Cor. Co., Cincinnati, O.
Newport Rolling Mill Co., Newport, Ky.
Klauser Mfg. Co., Dubuque, Ia.
Geo. L. Meeker & Co., Evansville, Ind.
Milwaukee Corr. Co., Milwaukee.
Republic Ir. & Stil. Co., Youngstown, O.
Wheeling Corr. Co., Wheeling, W. Va.

CEMENT (P. C. stands for Portland Cement)

*Pennsylvania-Dixie Cement Corp., N. Y.
(Brands: *Pennsylvania, Dexter, Penn-Allen, Royal & Chickfield P. C.*)
Acme Cement Corp., Catskill, N. Y.
Etna P. O. Co., Detroit, Mich.
Alabama P. C. Co., Birmingham, Ala.
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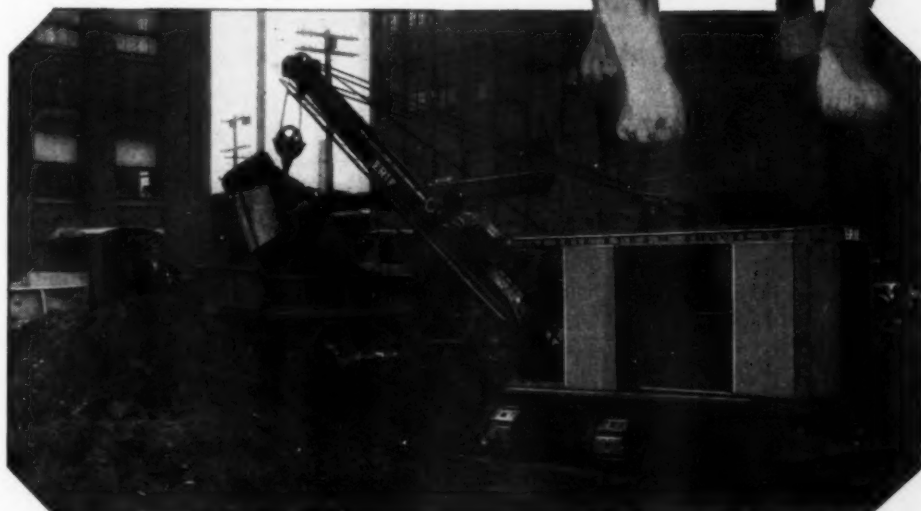
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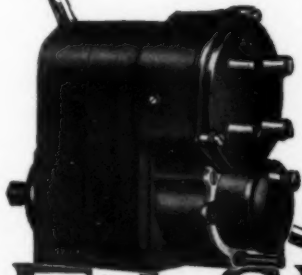
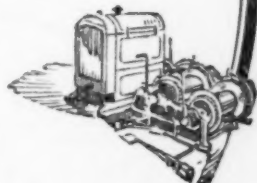
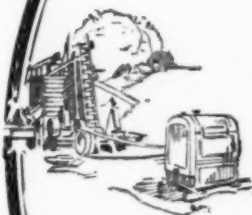
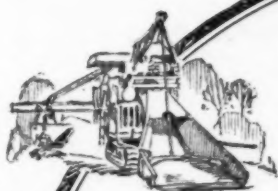
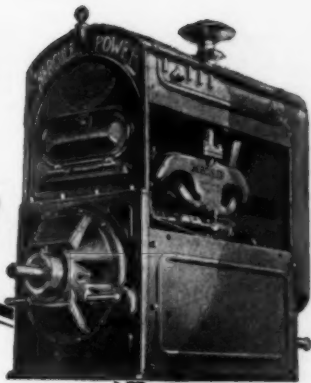
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- *Byers Mach. Co., Ravenna, O.
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 W. Q. O'Neill Co., Crawfordsville, Ind.
 Road Supply & Metal Co., Topeka, Kas.
 Sioux Falls Metal Culv. Co., Sioux Falls, S. D.
 So. Metal Culv. Co., Salisbury, N. C.
 Spokane Culv. & Tank Co., Spokane, Tenn.
 Metal Culv. Co., Nashville.
 U. S. Br. & Culv. Co., Bay City, Mich.
 Va. Metal Mfg. Co., Roanoke, Va.
 Western Metal Mfg. Co., Houston, Tex.
 Wheeling Corr. Co., Wheeling, W. Va.
 Wyatt Metal & Blr. Wks., Dallas, Tex.

CULVERT FORMS

Concrete Form Co., Inc., Syracuse, N.Y.
 Northfield Iron Co., Northfield, Minn.

CURE BOXES

Casey-Hedges Co., Chattanooga, Tenn.
 H. W. Clark Co., Mattoon, Ill.
 J. B. Clow & Sons, Chicago.
 Madison Fdry. Co., Cleveland, O.
 Mueller Co., Decatur, Ill.

CURE, GUTTER AND BASE FORMS (See Forms, Concrete)

CURE GUARDS, STEEL

W. S. Godwin Co., Baltimore.

CURE, STEEL PROTECTED

*Truscon Steel Co., Youngstown, O.
 Concrete Steel Co., N. Y.

CURING OF CONCRETE

*Dow Chemical Co., Midland, Mich.
 *Solvay Sales Corp., N. Y.

CUTTERS, PIPE, HAND

Armstrong Mfg. Co., Bridgeport, Ct.
 Barnes Tool Co., New Haven, Ct.
 Erie Tool Works, Erie, Pa.
 Greenfield Tap & Die Corp., Greenfield, Mass.
 Oswego Tool Co., Oswego, N. Y.
 Reed Mfg. Co., Erie, Pa.
 Walworth Mfg. Co., Boston.

CUTTERS, ROD AND WIRE

*Koehring Co., Milwaukee, Wis.
 Buffalo Forge Co., Buffalo, N. Y.
 Carolus Mfg. Co., Sterling, Ill.
 C. D. Edwards Mfg. Co., Albert Lea, Minn.
 Helwig Mfg. Co., St. Paul, Minn.
 M. & M. Wire Clamp Co., Minneapolis.
 Worthington Pump & Machy. Corp., N.Y.

CUTTING EDGES

*Russell Grader Mfg. Co., Minneapolis.
 J. D. Adams & Co., Indianapolis, Ind.
 Shunk Mfg. Co., Bucyrus, O.

CUTTING AND WELDING APPARATUS (See Welding Apparatus)

CYLINDER HEADS, RICARDO

*Waukesha Motor Co., Waukesha, Wis.

DERRICKS, GUY AND STIFF-LEG

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *Dobbie Fdry. & Mach. Co., Niagara Falls, N. Y.
 *S. Flory Mfg. Co., Bangor, Pa.
 *Insley Mfg. Co., Indianapolis, Ind.
 *Mundy Sales Corp., N. Y.
 *Saggen Derrick Co., Chicago.

*Universal Hstg. Machy. Corp., Buffalo.
 Amer. Hst. & Derrick Co., St. Paul, Minn.
 John T. Horton Co., N. Y.
 Lakeside Bridge & Steel Co., N. Milwaukee, Wis.

Lidgerwood Mfg. Co., N. Y.
 National Hstg. Eng. Co., Harrison, N. J.
 Street Bros. Mach. Wks., Chattanooga.
 Superior Iron Wks., Superior, Wis.

DERRICKS, PIPE LAYING

*Dobbie Fdry. & Mach. Co., Niagara Falls.
 Lidgerwood Mfg. Co., N. Y.
 Street Bros. Mach. Wks., Chattanooga.

DERRICKS, REVOLVING

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *Dobbie Fdry. & Mach. Co., Niagara Falls.
 Street Bros. Mach. Wks., Chattanooga.

DERRICKS, STEEL

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *Dobbie Fdry. & Mach. Co., Niagara Falls.
 *Insley Mfg. Co., Indianapolis, Ind.
 Amer. Hst. & Derrick Co., St. Paul.
 Hayward Co., N. Y.
 Street Bros. Mach. Wks., Chattanooga.
 Taylor Port. St. Derrick Co., Chicago.

DERRICKS, STEEL PORTABLE

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *Dobbie Fdry. & Mach. Co., Niagara Falls.
 Amer. Hst. & Derrick Co., St. Paul.
 Atlas Corp., New York.
 Lidgerwood Mfg. Co., N. Y.
 Street Bros. Mach. Wks., Chattanooga.

DERRICKS, TRAVELING

*Bay City Dredge Wks., Bay City, Mich.
 *Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *Dobbie Fdry. & Mach. Co., Niagara Falls.
 *Orton Crane & Shovel Co., Chicago.
 Amer. Hst. & Derrick Co., St. Paul.
 Hayward Co., N. Y.
 Nat'l. Hstg. Eng. Co., Harrison, N. J.
 Street Bros. Mach. Wks., Chattanooga.

DERRICK FITTINGS

*S. Flory Mfg. Co., Bangor, Pa.
 *Mundy Sales Corp., N. Y.
 Amer. Hst. & Derrick Co., St. Paul.
 Hayward Co., N. Y.
 Lidgerwood Mfg. Co., N. Y.
 Street Bros. Mach. Wks., Chattanooga.

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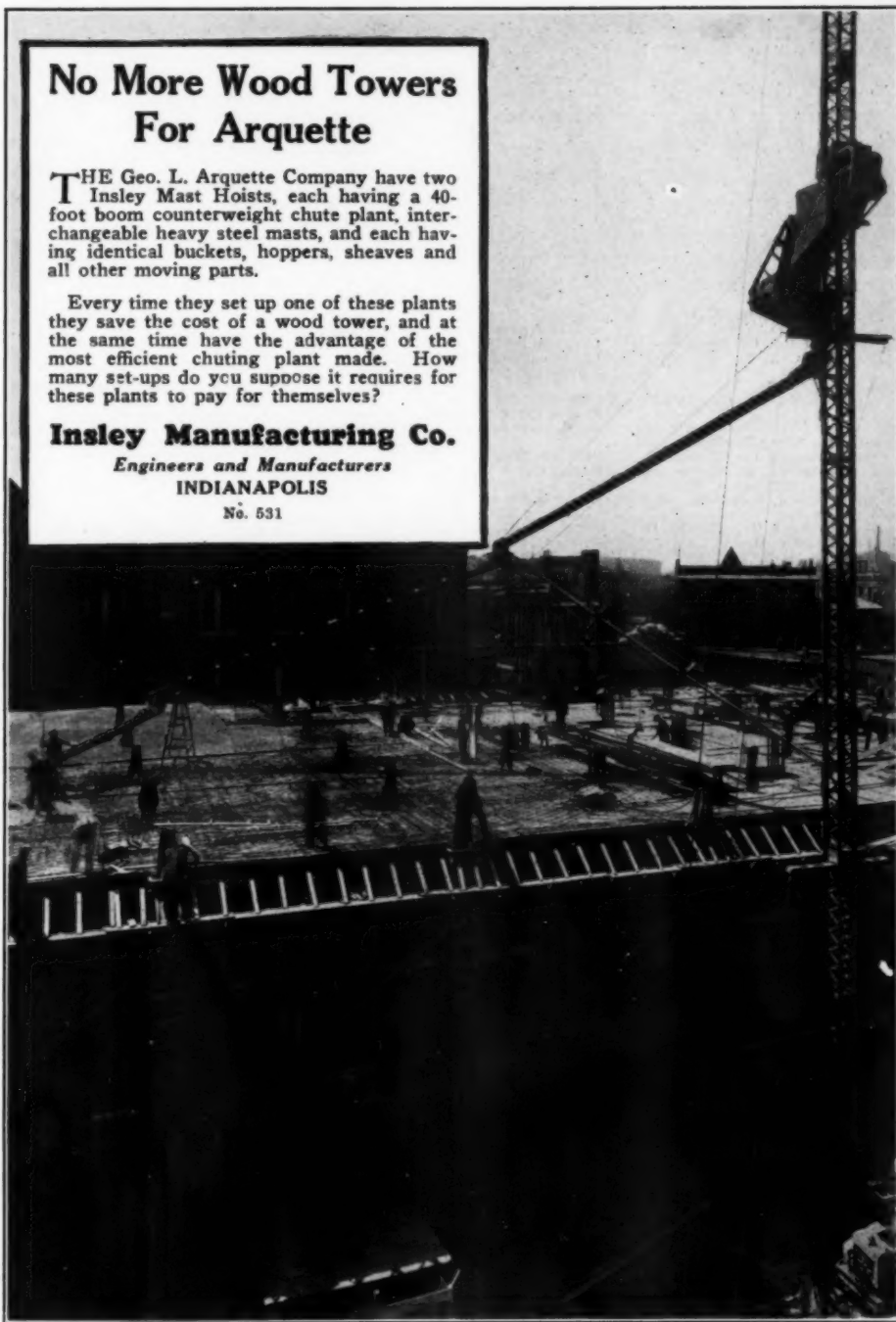
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Where to Purchase

DIAPHRAGM PUMPING OUTFITS

*John Lauson Mfg. Co., New Holstein, Wis.

DIESEL ENGINES (See Engines, Oil)

DISTRIBUTORS, TAR AND ASPHALT

*Kinney Mfg. Co., Boston
E. D. Etnyre & Co., Oregon, Ill.
Municipal Supply Co., So. Bend, Ind.

DISTRIBUTING PLANTS, CONCRETE

*Lakewood Eng. Co., Cleveland.
*Insley Mfg. Co., Indianapolis, Ind.
*Bansome Conc. Mch. Co., Dunellen, N.J.

DITCHING MACHINES (See Excavators)

DOORS AND SHUTTERS, STEEL ROLLING

*Cornell Iron Wks., B'klyn., N. Y.
Kinross Mfg. Co., Columbus, O.
Variety Fire Door Co., Chicago
J. G. Wilson Corp., N. Y.

DRAFTING MACHINES

Univ. Drafting Mach. Co., Cleveland, O.

DREDGES

*Bay City Dredge Wks., Bay City, Mich.
*Orton Crane & Shovel Co., Chicago.
Amer. Steel Dredge Co., Ft. Wayne, Ind.
Bucyrus Co., So. Milwaukee, Wis.
Ellicott Machy. Corp., Baltimore
Hayward Co., N. Y.
Marion Steam Shovel Co., Marion, O.
Osgood Co., Marion, O.
J. S. Schofield's Sons Co., Macon, Ga.
Stockton Iron Wks., Stockton, Cal.
Street Bros. Mach. Wks., Chattanooga
Superior Iron Wks., Superior, Wis.

DREDGES, DIPPER

*Bay City Dredge Wks., Bay City, Mich.
*Link-Belt Co., Chicago.
Amer. Steel Dredge Co., Ft. Wayne, Ind.
Bucyrus Co., So. Milwaukee, Wis.
Marion Steam Shovel Co., Marion, O.
Osgood Co., Marion, O.

DREDGES, HYDRAULIC

Bucyrus Co., South Milwaukee, Wis.
Ellicott Mach. Corp., Baltimore.
Marion Steam Shovel Co., Marion, O.
Morris Mach. Wks., Baldwinville, N.Y.

DREDGING MACHINERY

*S. Flory Mfg. Co., Bangor, Pa.
*Mundy Sales Corp., N. Y.
Lidgerwood Mfg. Co., N. Y.
Street Bros. Mach. Wks., Chattanooga.

DREDGING PUMPS AND ACCESSORIES

Eric Pump & Engine Wks., Medina, N.Y.
Ingersoll-Rand Co., N. Y.

DRILL STEEL SHARPENERS

(See Sharpeners)

DRILLS, CORE

*McKernan-Terry Drill Co., N. Y.
*Sullivan Machy. Co., Chicago.
Ingersoll-Rand Co., N. Y.

DRILLS, ROCK

*Dallett Co., Philadelphia.
*Denver Rock Drill Mfg. Co., Denver.
*Hardsoc Wonder Drill Co., Ottumwa, Ia.
*Sullivan Machy. Co., Chicago.
Chicago Pneum. Tool Co., N. Y.
Cleveland Pneum. Tool Co., Cleveland, O.
Cleveland Rock Drill Co., Cleveland, O.
*Silman Mfg. Co., E. Boston.
Helwig Mfg. Co., St. Paul, Minn.
Ingersoll-Rand Co., N. Y.
W. H. Keller, Inc., Grand Haven, Mich.
Wood Drill Wks., Paterson, N. J.

DRILLS FOR WELLS AND BLAST

HOLDS (See Well Drilling Machy)

DRUMS, HOLDING

*Blaw-Knox Co., Pittsburgh, Pa.

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
*Dubbe Pdry. & Mch. Co., Niagara Falls.
*Heitzel Steel Form & Ir. Co., Warren, O.
Hayward Co., N. Y.
Street Bros. Mach. Wks., Chattanooga.

DRYERS, ASPHALT AND CEMENT

Allis-Chalmers Mfg. Co., Milwaukee.
Amer. Blower Co., Detroit, Mich.
Atlas Dryer Co., Cleveland, O.
C. O. Bartlett & Snow Co., Cleveland, O.
F. D. Cummer & Son Co., Cleveland, O.
Mosher Mfg. Co., Chicago.
Ruggles-Coles Eng. Co., N. Y.

DRYERS, SAND AND GRAVEL

*Aerol Burner Co., West New York, N.J.
*Jos. Honhorst Co., Cincinnati, O.
*Littleford Bros., Cincinnati, O.
*Alex. Milburn Co., Baltimore, Md.
Amer. Process Co., N. Y.
C. O. Bartlett & Snow Co., Cleveland, O.
Chase & Lyman, Boston.
Chassee Oil Burner Co., Elkhart, Ind.
Mosher Mfg. Co., Chicago.

DUMP BODIES FOR CONCRETE

*Easton Car & Const'n., Co., Easton, Pa.
Lee Trailer & Body Co., Plymouth, Ind.

DUMP BODIES FOR MOTOR TRUCKS

*Easton Car & Const'n., Co., Easton, Pa.
*Hull Co., Milwaukee.
*Highway Trailer Co., Edgerton, Wis.
*Littleford Bros., Cincinnati, O.
*Mack Trucks, Inc., N. Y.
*Marion Steel Body Co., Marion, O.
*Van Dorn Iron Wks. Co., Cleveland, O.
*Wood Hydr. Hoist & Body Co., Detroit.
Amer. Prod. & Trad. Co., Chicago.
Am. Truck & Body Co., Martinsville, Va.
Anthony Co., Streator, Ill.
Atlas Corp., New York.
Columbia Body Corp., Columbia, Pa.
Columbian St. Tank Co., Kansas City, Mo.
Detroit Trailer & Mach. Co., Detroit.
Detwiler Mfg. Co., Gallon, O.
Eagle Wagon Wks., Auburn, N. Y.
Gallon All Steel Body Co., Gallon, O.
Griseum-Russell Co., N. Y.
Herr Dump Car Mfg. Co., Coatesville, Pa.
Hughes-Keenan Co., Mansfield, O.
The Hug Co., Highland, Ill.
Jennings Aut. Dump Body, Roanoke, Va.
Lee Trailer & Body Co., Plymouth, Ind.
Mandt Body Co., Keokuk, Ia.
Martin-Parry Corp., York, Pa.
N. Y. Central Ir. Wks., Hagerstown, Md.
Pechstein Iron Wks., Keokuk, Ia.
Stewart Iron Wks. Co., Cincinnati.

DUMP CARTS AND WAGONS, HORSE

*Acme Ed. Machy. Co., Frankfurt, N. Y.
*Austin-Western Rd. Machy. Co., Chicago.
*Eagle Wagon Wks., Auburn, N. Y.
*Highway Trailer Co., Edgerton, Wis.
*La Plant-Cheate Mfg. Co., Cedar Rapids, Ia.

*Russell Grader Mfg. Co., Minneapolis.

Acme Wagon Co., Emigsville, Pa.
J. D. Adams & Co., Indianapolis.
Austin Mfg. Co., Chicago.
Bain Wagon Co., Kenosha, Wis.
Columbia Body Corp., Columbia, Pa.
Electric Wheel Co., Quincy, Ill.
Gilbert Mfg. Co., Aberdeen, S. D.
Hagy Wagon Co., Abingdon, Va.
Q. H. Holsbrog & Bro., Jeffersonville, Ind.
Little Red Wagon Co., Omaha, Neb.
Leedinghaus-Eschenched Wagon Co., St. Louis.
Rex-Watson Corp., Canastota, N. Y.
Stockland Rd. Machy. Co., Minneapolis.
Streich Bros., Oakshoah, Wis.
Thornhill Wagon Co., Lynchburg, Va.
Western Wheeled Scraper Co., Aurora, Ill.

DUMP WAGONS, (ALL STEEL), TRAC-

TOR DRAWN

*Euclid Cr. & Hst. Co., Euclid Village, O.

*La Plant-Cheate Mfg. Co., Cedar Rapids, Iowa.

DYNAMITE (See Explosives)

EJECTORS, SEWAGE (See Sewage Ejectors)

ELECTRIC GENERATORS AND MOTORS

Louis Allis Co., Milwaukee.
Allis-Chalmers Mfg. Co., Milwaukee.
Crocker-Wheeler Co., Amper, N. J.
Fairbanks, Morse & Co., Chicago.
General Elec. Co., Schenectady, N. Y.
Graybar Electric Co., New York.
Ideal Elec. & Mfg. Co., Mansfield, O.
Lincoln Elec. Co., Cleveland, O.
Robbins & Myers Co., Springfield, O.
Wagner Elec. Mfg. Co., St. Louis.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

ELECTRIC LAMPS

General Elec. Co., Schenectady, N. Y.
Westinghouse Lamp Co., N. Y.

ELECTRIC LIGHTING PLANTS

*Climax Eng. Co., Clinton, Ia.
*Cook Motor Co., Delaware, O.
Allis-Chalmers Mfg. Co., Milwaukee.
Cushman Motor Wks., Lincoln, Neb.
Fairbanks, Morse & Co., Chicago.
Fuller & Johnson Mfg. Co., Madison, Wis.
General Elec. Co., Schenectady, N. Y.
Graybar Electric Co., New York.
Klauser Mfg. Co., Dubuque, Iowa.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

ELECTRIC TRANSFORMERS

Allis-Chalmers Mfg. Co., Milwaukee.
General Elec. Co., Schenectady, N. Y.
Kuhlman Elec. Co., Bay City, Mich.
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

ELECTRIC WIRES (See Wire)

ELEVATORS, BUCKET

*Atlas Eng. Co., Milwaukee.
*Austin-Western Rd. Machy. Co., Chicago.
*Chain Belt Co., Milwaukee, Wis.
*Good Rds. Machy. Co., Kennett Sq., Pa.
*Geo. Hais Mfg. Co., N. Y.
*Link-Belt Co., Chicago.
*Littleford Bros., Cincinnati.
*Russell Grader Mfg. Co., Minneapolis.
*Spears-Wellis Machy. Co., Oakland, Cal.
Abrams Cement Tool Co., Detroit.
Austin Mfg. Co., Chicago.
C. O. Bartlett & Snow Co., Cleveland, O.
Brown Hatg. Machy. Co., Cleveland, O.
Fairfield Eng. Co., Marion, Ohio.
Gifford-Wood Co., Hudson, N. Y.
Jeffrey Mfg. Co., Columbus, O.
New Holland Mch. Co., N. Holland, Pa.
Robins Conv. Belt Co., N. Y.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Univ. Rd. Machy. Co., Kingston, N. Y.
Webster Mfg. Co., Chicago.
Weller Mfg. Co., Chicago.
Worthington Pump & Mch. Corp., N.Y.

ELEVATORS, PASSENGER, FREIGHT, ETC.

Am. Elev. & Mach. Co., Louisville, Ky.
Atlantic Elev. Co., Inc., Philadelphia.
Bay State Elev. Co., Springfield, Mass.
Houghton Elev. & Mach. Co., Toledo, O.
Kaesner & Recht Co., Chicago.
Llewellyn Ir. Wks., Los Angeles, Cal.
Montgomery Elev. Co., Moline, Ill.
Otis Elevator Co., N. Y.
O. Ridgway & Son Co., Coatesville, Pa.
A. B. See Elec. Elev. Co., N. Y.
Spindel Elev. Corp., Reading, Pa.
Warner Elev. Mfg. Co., Cincinnati.
Warsaw Elev. Co., Warsaw, N. Y.

ENGINE DREDGING

Murray Ir. Wks. Co., Burlington, Ia.

ENGINES, FORD REPLACEMENT

*Waukesha Motor Co., Waukesha, Wis.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*



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- *Alamo Eng. Co., Hillsdale, Mich.
- *Caterpillar Tractor Co., San Leandro, Cal.
- *Climax Eng. Co., Clinton, Ia.
- *Continental Motors Corp., Muskegon, Mich.
- *Cook Motor Co., Delaware, O.
- *Domestic Eng. & Pump Co., Shippensburg, Pa.
- *Hercules Motors Corp., Canton, O.
- *John Lanson Mfg. Co., New Holstein, Wis.
- *Le Roi Co., Milwaukee.
- *Link-Belt Co., Chicago.
- *Nove Engine Co., Lansing, Mich.
- *Stover Mfg. & Eng. Co., Freeport, Ill.
- *Waukesha Motor Co., Waukesha, Wis.
- *Witte Engine Wks., Kansas City, Mo.
- *Allis-Chalmers Mfg. Co., Milwaukee.
- *Reaver Mfg. Co., Milwaukee, Wis.
- *Buda Co., Harvey, Ill.
- *Charter Gas Eng. Co., Sterling, Ill.
- *Chicago Pneum. Tool Co., N. Y.
- *Cushman Motor Wks., Lincoln, Neb.
- *Electric Wheel Co., Quincy, Ill.
- *Erted Mfg. Co., Portland, Ore.
- *Evinrude Motor Co., Milwaukee.
- *Fairbanks, Morse & Co., Chicago.
- *Foss Gas Eng. Co., Springfield, O.
- *Fuller & Johnson Mfg. Co., Madison, Wis.
- *Hinkley Motors, Inc., Detroit.
- *Ingersoll-Rand Co., New York.
- *Minneapolis Steel & Machy. Co., Minneapolis, Minn.
- *Sanderson-Cyclone Drill Co., Orrville, O.
- *Serval Mfg. Co., Evansville, Ind.
- *Sterling Eng. Co., Buffalo, N. Y.
- *Universal Motor Co., Oakbrook, Wis.
- *Weber Engine Co., Kansas City, Mo.
- *Wisconsin Motor Mfg. Co., Milwaukee.
- *Worthington Pump & Machy. Corp., N.Y.

ENGINES, HOISTING (See Hoists)

ENGINES, INDUSTRIAL (See Power Plants, Industrial)

ENGINES, KEROSENE

- *Alamo Eng. Co., Hillsdale, Mich.
- *Climax Eng. Co., Clinton, Ia.
- *Hercules Motors Corp., Canton, O.
- *John Lanson Mfg. Co., New Holstein, Wis.
- *Stover Mfg. & Eng. Co., Freeport, Ill.
- *Waukesha Motor Co., Waukesha, Wis.
- *Electric Wheel Co., Quincy, Ill.
- *Fuller & Johnson Mfg. Co., Madison, Wis.
- *Int'l Harvester Co. of Am., Chicago.

ENGINES, OIL

DIESEL

- *Allis-Chalmers Mfg. Co., Milwaukee.
- *Bethlehem St. Co., Bethlehem, Pa.
- *Busch-Sulzer Bros.-Diesel Eng. Co., St. Louis.
- *Fairbanks, Morse & Co., Chicago.
- *Hulton Iron Wks. Co., St. Louis.
- *McIntosh & Seymour Corp., Auburn, N.Y.
- *New London Ship & Eng. Co., Groton, Ct.
- *St. Mary's Oil Eng. Co., St. Charles, Mo.
- *Western Machy. Co., Los Angeles, Cal.

SEMI-DIESEL

- *Stover Mfg. & Eng. Co., Freeport, Ill.
- *Anderson Engine & Fdry. Co., Anderson, Ind.
- *Beasmer Gas Eng. Co., Grove City, Pa.
- *Buckeye Machinery Co., Lima, O.
- *Charter Gas Eng. Co., Sterling, Ill.
- *Chicago Pneum. Tool Co., N. Y.
- *De La Vergne Mach. Co., N. Y.
- *Fairbanks, Morse & Co., Chicago.
- *Foss Gas Eng. Co., Springfield, O.
- *Ingersoll-Rand Co., N. Y.
- *Lombard Gov. Co., Ashland, Mass.
- *Muncie Oil Eng. Co., Muncie, Ind.
- *Taylor Machy. Co., Cleveland, O.
- *Weber Eng. Co., Kansas City, Mo.
- *Worthington Pump & Machy. Corp., N.Y.

ENGINES, PUMPING

- *Climax Eng. Co., Clinton, Ia.

- *Hercules Motors Corp., Canton, O.
- *Stover Mfg. & Eng. Co., Freeport, Ill.
- *Waukesha Motor Co., Waukesha, Wis.
- *Allis-Chalmers Mfg. Co., Milwaukee.
- *Hooven, Owens, Rentschler Co., Hamilton, O.
- *Murray Iron Wks., Burlington, Ia.
- *Nordberg Mfg. Co., Milwaukee.
- *Worthington Pump & Machy. Corp., N.Y.

ENGINES, SWINGING

- *Mundy Sales Corp., N. Y.
- *Dake Eng. Co., Grand Haven, Mich.
- *Lidgerwood Mfg. Co., N. Y.

EXCAVATING MACHINERY (See Names Under Excavators, also Steam Shovels)

EXCAVATORS, CABLEWAY

- *Link-Belt Co., Chicago
- *Sauerman Bros., Inc., Chicago.
- *R. H. Beaumont Co., Philadelphia
- *Erted Machy. Mfg. Co., Portland, Ore.
- *Lidgerwood Mfg. Co., N. Y.
- *Street Bros. Mach. Wks., Chattanooga.

EXCAVATORS, CRAWLING TRACTOR

- *Byers Mach. Co., Ravenna, Ohio.
- *Erie Steam Shovel Co., Erie, Pa.
- *Thew Shovel Co., Lorain, O.

EXCAVATORS, DITCH AND TRENCH

- *Barber-Greene Co., Aurora, Ill.
- *Bay City Dredge Wks., Bay City, Mich.
- *Buckeye Trac. Ditcher Co., Findlay, O.
- *Byers Mach. Co., Ravenna, O.
- *Erie Steam Shovel Co., Erie, Pa.
- *Inley Mfg. Co., Indianapolis, Ind.
- *Koyne's Driller Co., Beaver Falls, Pa.
- *Link-Belt Co., Chicago
- *Orton Crane & Shovel Co., Chicago.
- *Parsons Co., Newton, Ia.
- *Russell Grader Mfg. Co., Minneapolis
- *Speeder Machy. Corp., Cedar Rapids, Ia.
- *Star Drilling Mach. Co., Akron, O.
- *Thew Shovel Co., Lorain, O.

- *Austin Mach. Corp., Muskegon, Mich.
- *Brown Htg. Machy. Co., Cleveland.
- *Cleveland Trencher Co., Euclid, O.
- *Economy Exc. Co., Iowa Falls, Ia.
- *Erted Machy. Mfg. Co., Portland, Ore.
- *Harward Co., N. Y.
- *Lidgerwood Mfg. Co., N. Y.
- *Marion Steam Shovel Co., Marion, O.
- *Monaghan Mach. Co., Chicago.
- *Moore Speedcrane Co., Chicago, Ill.
- *Osgood Co., Marion, O.
- *Owensboro Ditcher & Grader Co., Owensboro, Ky.
- *Street Bros. Mach. Wks., Chattanooga.
- *C. T. Topping Machy. Co., Dayton, O.

EXCAVATORS, DRAG-LINE

- *Bay City Dredge Wks., Bay City, Mich.
- *Byers Mach. Co., Ravenna, O.
- *Erie Steam Shovel Co., Erie, Pa.
- *Gallon Jr. Wks. & Mfg. Co., Gallon, O.
- *Koehring Co., Milwaukee.
- *Link-Belt Co., Chicago.
- *Orton Crane & Shovel Co., Chicago.
- *Russell Grader Mfg. Co., Minneapolis.
- *Sauerman Bros., Chicago.
- *Speeder Machy. Corp., Cedar Rapids, Ia.
- *Star Drilling Mach. Co., Akron, O.
- *Thew Shovel Co., Lorain, O.

- *Amer. Hat. & Derrick Co., St. Paul.
- *Austin Machy. Corp., Muskegon, Mich.
- *Brown Htg. Machy. Co., Cleveland, O.
- *Browning Crane Co., Cleveland, O.
- *Bucyrus Co., So. Milwaukee, Wis.
- *Economy Exc. Co., Iowa Falls, Ia.
- *Erted Machy. Mfg. Co., Portland, Ore.
- *C. L. Gade, Iowa Falls, Ia.
- *Harnischfeger Corp., Milwaukee, Wis.
- *Hayward Co., N. Y.
- *Industrial Wks., Bay City, Mich.
- *Lidgerwood Mfg. Co., N. Y.
- *Marion Steam Shovel Co., Marion, O.
- *Monaghan Mach. Co., Chicago.
- *Moore Speedcrane Co., Chicago
- *Osgood Co., Marion, O.
- *Page Eng. Co., Chicago
- *Street Bros. Mach. Wks., Chattanooga.

EXPANDED METAL

- *Trusco Steel Co., Youngstown, O.
- *Consolidated Exp. Metal Co., Wheeling, W. Va.
- *Northwestern Exp. Metal Co., Chicago.
- *Youngstown Pressed St. Co., Warren, O.

EXPANSION JOINT MATERIAL

- *Barber Asphalt Co., Philadelphia.
- *Barrett Co., N. Y.
- *Philip Carey Co., Cincinnati, O.
- *W. B. Meadows, Inc., Elgin, Ill.
- *Trusco Steel Co., Youngstown, O.
- *Hoosier Asph. Co., Alexandria, Ind.
- *Pioneer Asph. Co., Lawrenceville, Ill.
- *Serviced Products Corp., Chicago.
- *Texas Co., N. Y.
- *Waring-Underwood Co., Philadelphia.

EXPLOSIVES

- *Atlas Powder Co., Wilmington, Del.
- *E. I. Du Pont de Nemours & Co., E. Wilmington, Del.
- *Giant Powder Co., S. Francisco, Cal.
- *Grasselli Powder Co., Cleveland, O.
- *Hercules Powder Co., Wilmington, Del.

EXTENSION FRAMES, FORD TRUCK

- *Swedish Crucible Steel Co., Detroit.

FENCING

- *American Steel & Wire Co., Chicago.
- *Van Dorn Iron Wks. Co., Cleveland, O.
- *Adrian Wire Fence Co., Adrian, Mich.
- *Amer. Fence & Const. Co., New York.
- *Anchor Post Fence Co., N. Y.
- *Cyclone Fence Co., Waukegan, Ill.
- *Dwiggins Wire Fence Co., Anderson, Ind.
- *Ill. Wire & Mfg. Co., Joliet, Ill.
- *Ind. Steel & Wire Co., Muncie, Ind.
- *Interlocking Fence Co., Morton, Ill.
- *Keystone Stl. & Wire Co., Peoria, Ill.
- *Kokomo Stl. & Wire Co., Kokomo, Ind.
- *Nitselman Bros., Muncie, Ind.
- *Mich. Wire Fence Co., Adrian, Mich.
- *Page Stl. & Wire Prod. Corp., Bridgeport, Conn.
- *Pittsburgh Steel Co., Pittsburgh, Pa.
- *Stewart Jr. Wks. Co., Cincinnati, O.
- *Tex. Cyclone Fence Co., Ft. Worth, Tex.
- *Wayne Iron Wks., Wayne, Pa.
- *Wickwire-Spencer Steel Co., N. Y.

FILING EQUIPMENT STEEL

- *Van Dorn Iron Wks. Co., Cleveland, O.
- *Art Metal Constr. Co., Jamestown, N.Y.
- *Berger Mfg. Co., Canton, O.
- *Canton Art Metal Co., Canton.
- *Gen. Fireproofing Co., Youngstown, O.

FILTERS, OIL

- *S. F. Bowser & Co., Inc., Ft. Wayne, Ind.

FILTERS, WATER

- *Amer. Water Softener Co., Phila., Pa.
- *Cochrane Corp., Phila.
- *Graver Corporation, E. Chicago, Ind.
- *International Filter Co., Chicago
- *Norwood Eng. Co., Florence, Mass.
- *Roberts Filter Co., Darby, Pa.
- *W. B. Scaife & Sons, Pittsburgh, Pa.

FINISHING MACHINES, CONCRETE ROAD (See Concrete Road Finishers)

FIRE & POLICE ALARM SYSTEMS

- *Gamewell Co. Newton Upper Falls, Mass.
- *Harrington-Seaberg Corp., Moline, Ill.
- *Sterling Siren Fire Alarm Co., Rochester, N. Y.

FIRE ALARM SIRENS

- *Union Water Meter Co., Worcester, Mass.
- *Erick Elec. Siren Co., St. Paul, Minn.
- *Federal Sign System, Chicago.
- *Hendrie & Bolthoff Mfg. & Sup. Co., Denver, Colo.
- *Holtsner-Cabot Elec. Co., Boston
- *Sterling Siren Fire Alarm Co., Rochester, N. Y.

FIRE APPARATUS, MOTOR

- *Mack Trucks, Inc., N. Y.
- *Ahrens-Fox Fire Eng. Co., Cincinnati, O.

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CONTRACTORS AND ENGINEERS MONTHLY

No Other Shovel Can "Pull in its Neck"

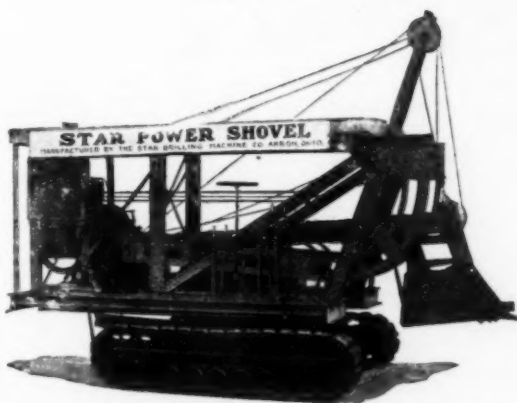
When it is in the way of operations

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The Patented **TELESCOPING**

HANDLE with

3/4-yd. Skimmer Scoop



The Star with handle telescoped back into machine

makes it possible to:

- work in close to machine.
- revolve completely in circle 22 ft. in diameter.
- work in close quarters.
- handle efficiently all jobs requiring:—

**Grading
Sub-Digging
Crane Boom**

{ with drop
bottom
ditcher
bucket }

The **STAR**
POWER SHOVEL
is equipped with
full length cater-
pillar

Full revolving

Powered with the
Waukesha 60
H.P., G.U. engine



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Name

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CEM 927

The Star Drilling Machine Co.
Akron, Ohio

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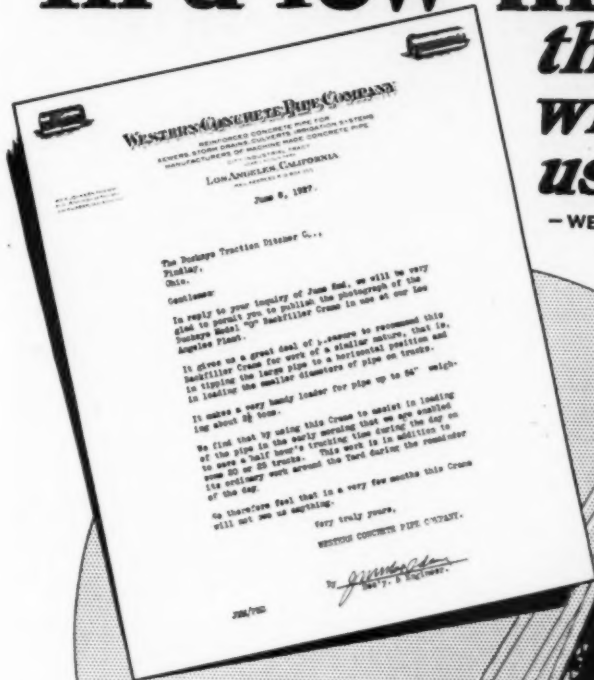
Where to Purchase

- American-La France Fire Eng. Co.,** Elmira, N. Y.
Boyer Fire App. Co., Logansport, Ind.
Brockway Motor Fire App. Co., Cortlandt, N. Y.
Buffalo Fire Appl. Corp., Buffalo, N. Y.
Foamite-Childs Corp., Utica, N. Y.
Hale Fire Pump Co., Conshohocken, Pa.
Jaeger Portable Power Corp., Detroit
Northern Fire Apparatus Co., Minneapolis, Minn.
Peter Pirsch & Sons Co., Kenosha, Wis.
Prospect Fire Engine Co., Prospect, O.
Seagrave Co., Columbus, O.
Stuts Fire Eng. Co., Indianapolis, Ind.
Waterous Fire Eng. Wks., St. Paul, Minn.
White Co., Cleveland
- FIRE EXTINGUISHERS, CHEMICAL**
American-La France Fire Eng. Co., Elmira, N. Y.
Buffalo Fire App. Corp., Buffalo, N. Y.
Foamite-Childs Corp., Utica, N. Y.
Pyrene Mfg. Co., Newark, N. J.
- FIRE HOSE (See Hose, Fire)**
- FIRST AID EQUIPMENT**
American-La France Fire Engine Co., Elmira, N. Y.
- FITTINGS, ACID RESISTING**
***Barber Asphalt Co.,** Philadelphia.
- FLEXIBLE JOINTS**
***Central Foundry Co.,** N. Y.
***U. S. C. I. Pipe & Fdry. Co.,** Burlington, N. J.
Coldwell-Wilcox Co., Newburgh, N. Y.
Crane Co., Chicago.
United Lead Company, N. Y.
- FLOOD LIGHTING PROJECTORS**
General Electric Co., Schenectady.
- FLOORING, COMPOSITION**
***Barber Asphalt Co.,** Phila., Pa.
***Barrett Co.,** N. Y.
Am. Mason Safety Tr. Co., Lowell, Mass.
Johns-Manville, Inc., N. Y.
Marine Decking & Sup. Co., Phila., Pa.
Franklyn R. Muller & Co., Waukegan, Ill.
- FLOORS, WOOD BLOCK**
***Barrett Co.,** N. Y.
Carter Bloxmond Flooring Co., Kansas City, Mo.
Jennison-Wright Co., Toledo, O.
Midland Creos. Co., Toledo, O.
Republic Creos. Co., Indianapolis, Ind.
Sou. Wood Preserving Co., Atlanta, Ga.
Wyckoff Pipe & Creos. Co., N. Y.
- FLUSH TANKS**
***Pacific Flush Tank Co.,** Chicago & N. Y.
- FLUSHERS, STREET (See Street Finishers and Sprinklers)**
- FORGES**
Buffalo Forge Co., Buffalo, N. Y.
Hauck Mfg. Co., B'klyn, N. Y.
- FORGES, OIL (Rivet Heating)**
***Mead-Morrison Mfg. Co.,** E. Boston
Hauck Mfg. Co., B'klyn, N. Y.
- FORM CLAMPS**
***Insley Mfg. Co.,** Indianapolis, Ind.
***Williams Natl. Form Clamp Co.,** Ch'go.
W. A. Kuhlman & Co., Toledo, O.
M. & M. Wire Clamp Co., Minneapolis.
Universal Form Clamp Co., Chicago.
- FORMS, CONCRETE**
***Blaw-Knox Co.,** Pittsburgh, Pa.
***Heltsel F. L. Form & Ir. Co.,** Warren, O.
***Lakewood Eng. Co.,** Cleveland, O.
***Truscon Steel Co.,** Youngstown, O.
Concrete Form Co., Inc., Syracuse, N. Y.
- Hotchkiss Stl. Products Co.,** Binghamton, N. Y.
Metal Forms Corp., Milwaukee.
- FORMS, MANHOLE, PIPE, SEWER, ETC**
***Heltsel Stl. Form & Ir. Co.,** Warren, O.
- FORMGRADERS**
***Ted Carr & Co.,** Chicago
- FOUNTAINS, DRINKING**
Casey-Hedges Co., Chattanooga, Tenn.
Jas. B. Clow & Sons, Chicago.
Crane Co., Chicago.
J. L. Mott Iron Wks., New York
Murdoch Mfg. & Sup. Co., Cincinnati.
Pero San. Dr. Fin. Co., Haydensville, Mass.
Rundle-Spence Mfg. Co., Milwaukee.
Stewart Iron Wks. Co., Cincinnati, O.
Halsey W. Taylor Co., Warren, O.
Century Brass Wks., Belleville, Ill.
- FULL CRAWLERS**
***Trackson Co.,** Milwaukee
- FURNITURE AND FILES, STEEL**
***Van Dorn Iron Wks. Co.,** Cleveland, O.
Art Metal Const. Co., Jamestown, N. Y.
Canton Art Metal Co., Canton.
Gen. Fireproofing Co., Youngstown, O.
- FURRING AND SLEEPER ANCHORS**
Dayton Sure Grip & Shore Co., Dayton, O.
- GARBAGE CANS (See Cans)**
- GARBAGE DISPOSAL SYSTEMS**
American Beccari Corp., N. Y.
C. O. Bartlett & Snow Co., Cleveland, O.
Decarie Incinerator Co., L. I. C., N. Y.
Goder Incinerator Corp., Chicago.
Hiler Eng. & Const. Co., B'klyn, N. Y.
Midwest Incinerator Co., Chicago.
Morse-Boulger Destructor Co., N. Y.
Nye Odorless Crematory Co., Macon, Ga.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
- GARBAGE TRAILERS AND BODIES**
***Hell Co.,** Milwaukee.
***Highway Trailer Co.,** Edgerton, Wis.
***Littleford Bros.,** Cincinnati.
Atis Corp., New York.
Detroit Trailer & Mach. Co., Detroit.
Lee Trailer & Body Co., Plymouth, Ind.
Troy Trailer & Wagon Co., Troy, O.
- GARBAGE TRUCKS**
***Hell Co.,** Milwaukee, Wis.
Geo. H. Holsbog & Bro., Jeffersonville, Ind.
Lee Trailer & Body Co., Plymouth, Ind.
Rex-Watson Corp., Canastota, N. Y.
- GAS METERS (See Meters, Gas)**
- GAS PRODUCERS**
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
R. D. Wood & Co., Phila., Pa.
- GASOLINE STORAGE TANKS**
***Hell Co.,** Milwaukee, Wis.
***Littleford Bros.,** Cincinnati, O.
Biggs Boiler Works, Akron, O.
Birmingham Tank Co., Birmingham, Ala.
S. F. Bowser & Co., Inc., Ft. Wayne, Ind.
Chicago Bridge & Iron Wks., Chicago.
Graver Corp., E. Chicago, Ind.
Wm. B. Sealife & Sons, Pittsburgh, Pa.
Tokheim Oil Tank & Pump Co., Ft. Wayne, Ind.
***United Iron Wks. Inc.,** C. City, Mo.
Wayne Co., Ft. Wayne, Ind.
- GATES, SLUICE**
Chapman Valve Mfg. Co., Indian Orchard, Mass.
Coffin Valve Co., Boston, Mass.
Coldwell-Wilcox Co., Newburgh, N. Y.
R. Hardesty Mfg. Co., Denver.
Ladlow Valve Mfg. Co., Troy, N. Y.
- GATES FOR PARKS AND CEMETERIES**
Stewart Iron Wks. Co., Cincinnati, O.
Wayne Iron Wks., Wayne, Pa.
- GAUGES, WATER**
Bristol Co., Waterbury, Conn.
Lankenheimer Co., Cincinnati, O.
Walworth Mfg. Co., Boston.
- GAUGES, SURFACE, RESERVOIR AND SPECIAL WATER-WORKS**
Builders Iron Fdry., Providence, R. I.
Simplex Valve & Meter Co., Phila., Pa.
- GENERATOR SETS**
***Climax Eng. Co.,** Clinton, Iowa.
***Cook Motor Co.,** Delaware, O.
Carbic Mfg. Co., Duluth.
- GLASS, FIREPROOF (See Wire Glass)**
- GOVERNORS, GASOLINE ENGINE**
Gardner Governor Co., Quincy, Ill.
Pickering Governor Co., Portland, Ct.
- GRADERS, ROAD (See Road Graders)**
- GRADERS, BLADES**
***Gallun Ir. Wks. & Mfg. Co.,** Galien, O.
***Russell Grader Mfg. Co.,** Minneapolis.
J. D. Adams & Co., Indianapolis, Ind.
Shank Mfg. Co., Bucyrus, O.
- GRAND STANDS, PORTABLE**
Circle A. Prod. Corp., Newcastle, Ind.
Leavitt Mfg. Co., Urbana, Ill.
Wayne Iron Wks., Wayne, Pa.
- GRATING, STEEL**
***Blaw-Knox Co.,** Pittsburgh.
- GREASE**
***Dixoyl, Inc.,** St. Louis.
- GRINDERS**
Chicago Pneum. Tool Co., N. Y.
Cleveland Pneum. Tool Co., Cleveland, O.
Ingersoll-Rand Co., N. Y.
- GRIZZLIES**
***Smith Engineering Works, Milwaukee**
Allis-Chalmers Mfg. Co., Milwaukee
Austin Mfg. Co., Chicago.
Robins Conv. Belt Co., New York
Stephens-Adams Mfg. Co., Angola, Ill.
- GUARDS, ROAD & HIGHWAY**
***Am. Steel & Wire Co.,** Chicago.
***Williamsport Wire Rope Co.,** Williamsport, Pa.
Cyclone Fence Co., Waukegan, Ill.
Hazard Mfg. Co., Wilkesbarre, Pa.
Stewart Iron Wks. Co., Cincinnati.
Wickwire-Spencer Steel Co., N. Y.
- GYPsum PRODUCTS**
U. S. Gypsum Co., Chicago
Fenton Mfg. Co., Cleveland, O.
- HAMMERS, STEAM, FILE (See Pin Hammers, Steam)**
- HEAT INSULATING MATERIAL**
***Philip Carey Co.,** Cincinnati, O.
Johns-Manville, Inc., N. Y.
- HEATING KETTLES (See Kettles)**
- HIGHWAY MOWERS**
Rawls Mfg. Co., Chicago.
- HITCHES**
***Gustav Schaefer Wagon Co.,** Cleveland, O.
***Trail-It Co.,** St. Paul.
***Whitehead & Kales Co.,** Detroit.
Detroit Trailer & Mach. Co., Detroit.
Fenton Mfg. Co., Cleveland, O.
- HOISTS, AUTOMATIC**
Zetterland Hat. & Mch. Co., Milwaukee.
- HOISTS, BELT-DRIVEN**
***Amer. Saw Mill Mch'y. Co.,** Hackettstown, N. J.
***Dobbie Fdry. & Mach. Co.,** Niagara Falls.
***Domestic Engine & Pump Co.,** Shippensburg, Pa.
***Mead-Morrison Mfg. Co.,** E. Boston, Mass.
***Mundy Sales Corp.,** N. Y.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

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—WESTERN CONCRETE PIPE CO.
LOS ANGELES



This Backfiller-Crane with great service range costs but little more than the ordinary backfiller of limited working ability. Illustrative and descriptive Bulletin mailed on request.



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Buckeye TRENCH EXCAVATORS FOR OVER 30 YEARS

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

Where to Purchase

American Hoist & Derrick Co., St. Paul, Minn.
Lidgerwood Manufacturing Co., N. Y.
Street Bros. Mach. Wks., Chattanooga
Weller Mfg. Co., Chicago.

HOISTS, CONCRETE, TOWER

*Domestic Eng. & Pump Co., Shippensburg, Pa.
*Isley Mfg. Co., Indianapolis, Ind.
*Lakewood Eng. Co., Cleveland, O.
*Mead-Morrison Mfg. Co., East Boston.
*Mundy Sales Corp., N. Y.
*Novo Engine Co., Lansing, Mich.
*Ransome Conc. Mch. Co., Dunellen, N.J.
English Bros. Machy. Co., Kansas City.
Lidgerwood Manufacturing Co., N. Y.
Street Bros. Mach. Wks., Chattanooga.

HOISTS, ELECTRIC

*Clyde Iron Wks. Sales Co., Duluth, Minn.
*Dobbie Fdry. & Mach. Co., Niagara Falls
*Domestic Eng. & Pump Co., Shippensburg, Pa.

*S. Flory Mfg. Co., Bangor, Pa.
*Mead-Morrison Mfg. Co., E. Boston.
*Mundy Sales Corp., N. Y.
*Novo Engine Co., Lansing, Mich.
*O. K. Clutch & Mach. Co., Columbia, Pa.
Am. Hoist & Derrick Co., St. Paul, Minn.
Chisholm-Moore Co., Cleveland, O.
Construction Machy. Co., Waterloo, Ia.
Dake Eng. Co., Grand Haven, Mich.
English Bros. Machy. Co., Kansas City.
Harnischfeger Corp., Milwaukee.
Lidgerwood Manufacturing Co., N. Y.
Nil. Hoisting Eng. Co., Harrison, N. J.
Northern Eng. Wks., Detroit
Street Bros. Mach. Wks., Chattanooga.
Thomas Elev. Co., Chicago.
Treadwell Eng. Co., Easton, Pa.
Vulcan Iron Wks., Wilkes-Barre, Pa.

HOISTS, FORDSON

*Clyde Ir. Wks. Sales Co., Duluth, Minn.
Ersted Mach. & Mfg. Co., Portland, Ore.
Okla. Eng. & Fdry. Co., Muskogee, Okla.
Otis Eng. Corp., N. Y.
Sheffield Tool & Supply Co., Sheffield, Pa.

HOISTS, GASOLINE

*Amer. Saw Mill Mch. Co., Hackettstown, N. J.
*Clyde Iron Wks. Sales Co., Duluth, Minn.
*Domestic Eng. & Pump Co., Shippensburg, Pa.
*S. Flory Mfg. Co., Bangor, Pa.
*Mead-Morrison Mfg. Co., E. Boston.
*Mundy Sales Corp., N. Y.
*Novo Engine Co., Lansing, Mich.
*O.K. Clutch & Mach. Co., Columbia, Pa.
*Pioneer Tractors, Inc., Winona, Minn.
Amer. Hoist & Der. Co., St. Paul, Minn.
Amer. Mfg. & Eng. Co., Kalamazoo, Mich.
Austin Mfg. Co., Chicago.
Buffalo Hoist & Derrick Co., Buffalo, N. Y.
C. H. & E. Mfg. Co., Milwaukee.
Construction Machy. Co., Waterloo, Ia.
Dake Eng. Co., Grand Haven, Mich.
English Bros. Machy. Co., Kansas City.
Ersted Mch. Mfg. Co., Portland, Ore.
Lansing Co., Lansing, Mich.
Lidgerwood Manufacturing Co., N. Y.
Nil. Hoisting Eng. Co., Harrison, N. J.
Orr & Sombower, Reading, Pa.
Street Bros. Mach. Wks., Chattanooga.
Thomas Elevator Co., Chicago.

HOISTS, PNEUMATIC

*Denver Rock Drill Mfg. Co., Denver.
*Mead-Morrison Mfg. Co., E. Boston.
*Sullivan Mch. Co., Chicago.
Chicago Pneumatic Tool Co., N. Y.
Curtis Pn. Mch. Co., St. Louis.
Dake Engine Co., Grand Haven, Mich.
Detroit Hoist & Mach. Co., Detroit.
Gilman Mfg. Co., E. Boston, Mass.

Hanna Eng. Works, Chicago.
Independent Pneum. Tool Co., Chicago.
Ingersoll-Rand Co., N. Y.
Northern Eng. Wks., Detroit, Mich.
Worthington Pump & Mch. Corp., N.Y.

HOISTS, STEAM

*Clyde Iron Wks. Sales Co., Duluth, Minn.
*S. Flory Mfg. Co., Bangor, Pa.
*Mead-Morrison Mfg. Co., E. Boston.
*Mundy Sales Corp., N. Y.
Amer. Hoist & Derrick Co., St. Paul, Minn.
Dake Engine Co., Grand Haven, Mich.
Hardie-Tynes Mfg. Co., Birmingham, Ala.
Ingersoll-Rand Co., N. Y.
Lidgerwood Manufacturing Co., N. Y.
Nil. Hoisting Eng. Co., Harrison, N. J.
Orr & Sombower, Reading, Pa.
Street Bros. Mach. Wks., Chattanooga.
Thomas Elev. Co., Chicago.
Treadwell Eng. Co., Easton, Pa.

HOISTS FOR MOTOR TRUCKS

*Hall Co., Milwaukee.
*Van Dorn Iron Wks., Cleveland, O.
*Wood Hydr. Hoist & Body Co., Detroit.
Atia Corp., New York.
Hydr. Hoist Mfg. Co., St. Paul, Minn.
Joliet Mfg. Co., Joliet, Ill.
Lidgerwood Manufacturing Co., N. Y.
Rock Mfg. Co., Waterloo, N. Y.

HOISTS, PORTABLE

*Pioneer Tractors, Inc., Winona, Minn.
Jas. B. Seaverns Co., Batavia, Ill.
Joliet Mfg. Co., Joliet, Ill.

HOPPERS, CONCRETE (Aggregate Measuring)

*Holtzcl St. Form & Ir. Co., Warren, O.
*Lakewood Eng. Co., Cleveland, O.
*Littleford Bros., Cincinnati, O.
*Ransome Conc. Mch. Co., Dunellen, N. J.
Butler Bin Co., Waukesha, Wis.
Jas. B. Seaverns Co., Batavia, Ill.

HOSE, AIR

*The Dallett Co., Phila., Pa.
*Hardsocg Wonder Dr. Co., Ottumwa, Ia.
Chicago Pneumatic Tool Co., N. Y.
Cincinnati Rubber Mfg. Co., Cincinnati.
Cleveland Rock Drill Co., Cleveland, O.
Gilman Mfg. Co., E. Boston, Mass.
Goodyear Tire & Rubber Co., Akron, O.
Ingersoll-Rand Co., N. Y.
Mulconroy Co. Inc., Phila., Pa.
Penns. Flexible Metallic Tubing Co., Phila., Pa.
Republic Rubber Co., Youngstown, O.
U. S. Rubber Co., N. Y.

HOSE, FIRE

Bi-Lateral Fire Hose Co., Chicago.
Eureka Fire Hose Mfg. Co., N. Y.
Fabrie Fire Hose Co., N. Y.
B. F. Goodrich Rubber Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.

HOUSE-MOVING EQUIPMENT

*La Plant-Cheate Mfg. Co., Cedar Rapids, Ia.

HOUSE NUMBERS

Hamilton Metal Prod. Co., Hamilton, O.
C. H. Hanson Co., Chicago.
Niagara Metal Stamping Corp., Niagara Falls, N. Y.

HOUSES, PORTABLE (See Portable Buildings)

HYDRANTS, FIRE

Chapman Valve Mfg. Co., Indian Orchard, Mass.
Columbian Ir. Wks., Chatta., Tenn.
Darling Valve & Mfg. Co., Williamsport, Pa.
Eddy Valve & Mfg. Co., Waterford, N.Y.
Iowa Valve Co., Oskaloosa, Ia.
Kennedy Valve Mfg. Co., Elmira, N. Y.

Ludlow Valve Mfg. Co., Troy, N. Y.
Norwood Eng. Co., Florence, Mass.
Rensselaer Valve Co., Troy, N. Y.
A. P. Smith Mfg. Co., E. Orange, N. J.
Watrous Co., St. Paul
R. D. Wood & Co., Phila., Pa.

HYDRAULIC RAMS

Deming Co., Salem, O.
Johnson Mfg. Co., Seattle, Wash.
Rife Hydraulic Engine Co., N. Y.
Rumsey Pump Co., Seneca Falls, N. Y.

ICE-MAKING MACHINERY

Arctic Ice Mach. Co., Canton, O.
Baker Ice Mach. Co., Omaha, Neb.
Brunswick-Krosschell Co., N. Brunswick, N. J.
Carbondale Mach. Co., Carbondale, Pa.
De La Vergne Mach. Co., N. Y.
Frick Co., Inc., Waynesboro, Pa.
Ingersoll-Rand Co., New York.
Triumph Ice Mach. Co., Cincinnati, O.
United Iron Wks., Inc., K. City, Mo.
Vilter Mfg. Co., Milwaukee, Wis.
Henry Vogt Mach. Co., Louisville, Ky.
York Mfg. Co., York, Pa.

IGNITION SYSTEMS

*Eisemann Magneto Corp., New York
American Bosch Magneto Corp., Springfield, Mass.
Dayton Eng. Lab. Co., Dayton, O.
Splittdorf Electric Co., Newark, N. J.

INCINERATORS, GARBAGE (See Garbage Disposal)

INDICATOR POSTS (See Valves)

INSPECTING LABORATORIES

*Conard & Busby, Burlington, N. J.
*Pittsburgh Testing Lab., Pittsburgh.
Allentown Testing Lab., Allentown, Pa.
E. L. Conwell & Co., Phila., Pa.
Gulick-Henderson Co., N. Y.
Robert W. Hunt Co., Chicago.
N. Y. Testing Lab., N. Y.

INSTRUMENTS AND SUPPLIES (Surveyors' and Engineers')

Wm. Ainsworth & Sons, Denver, Col.
L. Beckman Co., Toledo, O.
O. L. Berger & Sons, Boston
Brandis & Sons Mfg. Co., B'klyn N. Y.
Buff & Buff Mfg. Co., Boston
Eugene Dietzgen Co., Chicago
W. & L. E. Gurley, Troy, N. Y.
Kaufel & Esser Co., Hoboken, N. J.
Kolesch & Co., New York
A. Liets Co., San Francisco
Leupold-Volpel & Co., Portland, Ore.
Warren Knight Co., Phila., Pa.
F. Weber & Co., Phila., Pa.
David White Co., Milwaukee, Wis.

INTEGRAL CURE AND BASE FORMS (See Forms, Concrete)

IRON WORK, STRUCTURAL AND ORNAMENTAL (See Bridges and Buildings)

JACKS, LIFTING

*McKiernan-Terry Drill Co., N. Y.
*Templeton, Kenly & Co., Ltd., Chicago.
Duff Mfg. Co., Pittsburgh, Pa.
Joyce-Cridland Co., Dayton, O.
A. O. Norton, Inc., Boston
Oil Jack Co., N. Y.
Rees Mfg. Co., Pittsburgh, Pa.
Watson-Stillman Company, N. Y.

JACKS, PIPE FORGING

Duff Mfg. Co., Pittsburgh, Pa.
Easy Mfg. Co., Lincoln, Neb.

JAIL AND PRISON WORK

*Van Dorn Iron Wks. Co., Cleveland
E. T. Barnum Iron Wks., Detroit
Fries & Son Steel Const. & Eng. Co., Covington, Ky.

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"The STANDARD" PLASTER CONCRETE MORTAR MIXER

*Inaugurates a new standard
of economy and efficiency
in plaster mixing*

With "The Standard" Mixer you can mix your plaster with the same efficiency as concrete or mortar, because only in "The Standard" Mixer will you find the all-steel narrow drum construction—the fastest and most efficient mixing drum yet designed.

Write for full particulars

THE STANDARD SCALE & SUPPLY CORP.

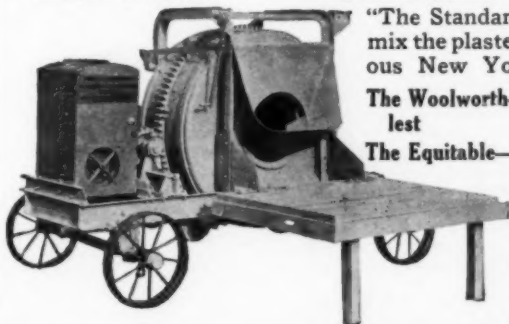
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Philadelphia: 510 Arch Street

Cleveland: 721 St. Clair Ave., N. E.
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"The Standard" was used to mix the plaster for three famous New York buildings—

The Woolworth—the world's tallest

The Equitable—the world's largest

The Park Central Hotel—the world's largest apartment house

—thus inaugurating a new standard of economy and efficiency in plaster-mixing for the entire building industry.

**ON New York's
BIG 3**

Where to Purchase

Pauly Jail Bldg. Co., St. Louis, Mo.
Stewart Iron Wks. Co., Cincinnati, O.

JOINTS, EXPANSION PAVING (See Expansion Joint Material)

JOINTS, FLEXIBLE PIPE (See Flexible Joints)

JOISTS, STEEL
*Truscon Steel Co., Youngstown, O.
Berger Mfg. Co., Canton, O.
Gen'l Firefig. Bldg. Products, Youngstown, O.

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*Blystone Mfg. Co., Cambridge Spgs., Pa.
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*Lakewood Eng. Co., Cleveland, O.
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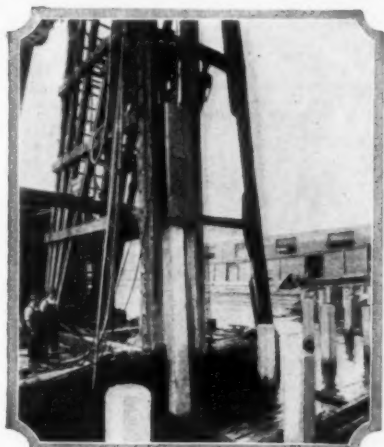
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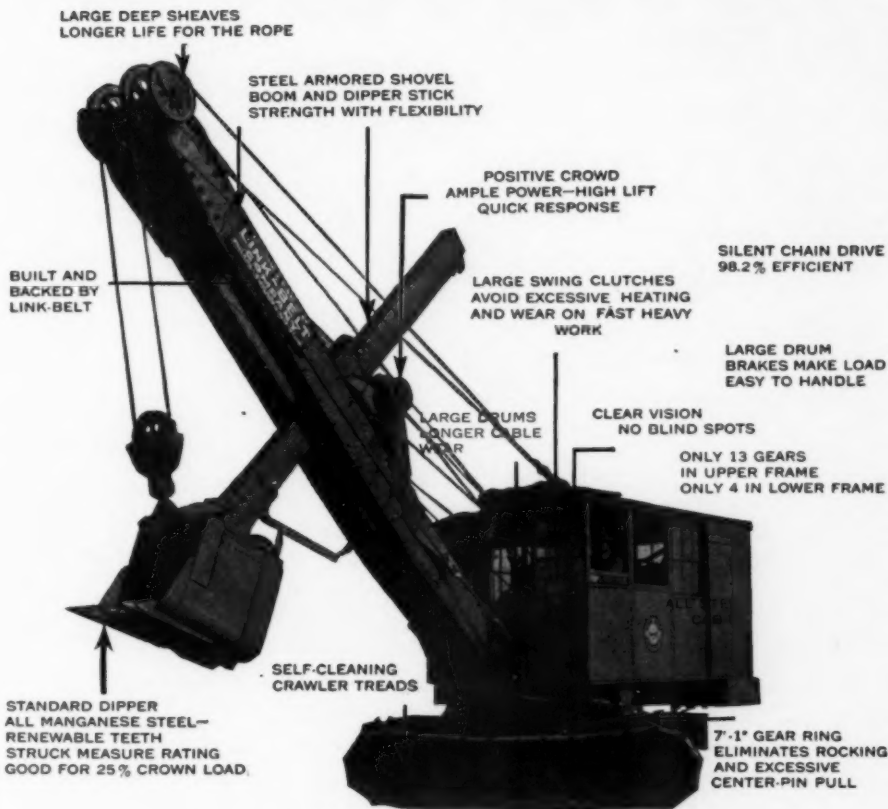
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- AIRCELL**
 *Philip Carey Co., Cincinnati, O.
 Ehret Mag. Mfg. Co., Valley Forge, Pa.
 Johns-Mansville, Inc., N. Y.
 Keasbey & Mattison Co., Ambler, Pa.
 Ntl. Asbestos Co., Jersey City, N. J.
 Norristown Mag. & Asb. Co., Norristown, Pa.
 Sall Mountain Co., Chicago
 H. F. Watson Co., Erie, Pa.
- 85 PER CENT MAGNESIA**
 *Philip Carey Co., Cincinnati, O.
 Ehret Mag. Mfg. Co., Valley Forge, Pa.
 Johns-Mansville, Inc., N. Y.
 Keasbey & Mattison Co., Ambler, Pa.
 Norristown Mag. & Asb. Co., Norristown, Pa.
- WOOD**
 Redwood Mfrs. Co., San Francisco
 A. Wyckoff & Sons Co., Elmira, N. Y.
- PIPE CUTTERS (See Cutters, Pipe, Hand)**
- PIPE FITTINGS**
 *Central Fdry. Co., N. Y.
 *U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.
 Amer. C. I. Pipe Co., Birmingham, Ala.
 Builders Iron Fdry., Providence, R. I.
 J. B. Clow & Sons, Chicago
 Crane Co., Chicago
 Donaldson Iron Co., Emsau, Pa.
 Lunkenheimer Co., Cincinnati, O.
 Nil. C. I. Pipe Co., Birmingham, Ala.
 Reading Stl. Casting Co., Inc., Bridgeport, Conn.
 Warren Fdry. & Pipe Co., N. Y.
 R. D. Wood & Co., Phila., Pa.
- PIPE HANDLING MACHINERY**
 Taylor Port. Stl. Derrick Co., Chicago
- PIPE JOINT COMPOUND (Sewer)**
 *Philip Carey Co., Cincinnati, O.
 *Pacific Plush Tank Co., Chi. and N. Y.
 G. K. Sales Co., Macungie, Pa.
 Leadite Company, Inc., Phila., Pa.
 Ruberoid Co., N. Y.
 Texas Co., New York
 Waring-Underwood Co., Phila., Pa.
- PIPE JOINT MATERIAL (Cast Iron)**
 Hydraulic Development Co., Boston
 The Leadite Co., Phila., Pa.
 United Lead Co., N. Y.
- PIPE PUSHERS**
 Duff Mfg. Co., Pittsburgh.
 Easy Mfg. Co., Lincoln, Neb.
 Grant Mfg. Co., Council Bluffs, Ia.
- PLAYGROUND APPARATUS**
 American Playground Device Co., Anderson, Ind.
 Chicago Gym. Equip. Co., Chicago
 Everwear Mfg. Co., Springfield, O.
 Giant Mfg. Co., Council Bluffs, Ia.
 Hill-Standard Co., Anderson, Ind.
 Fred. Medart Mfg. Co., St. Louis, Mo.
 Mitchell Mfg. Co., Milwaukee
- FLAWS, CONTRACTORS'**
 *Austin-West's Ed. Mach. Co., Chicago
 *Caterpillar Trac. Co., San Leandro, Cal.
 *Gallion Ir. Wks. & Mfg. Co., Gallion, O.
 *Russell Grader Mfg. Co., Minneapolis
 *Ward Plow Co., Batavia, N. Y.
 J. D. Adams & Co., Ind'p'lis, Ind.
 American Steel Scraper Co., Sidney, O.
 Burch Corp'n., Crestline, O.
 Deere & Co., Moline, Ill.
 C. D. Edwards Mfg. Co., Albert Lee, Minn.
 International Harvester Co., Chicago
 Roderick Lean Mfg. Co., Mansfield, O.
 Moline Implement Co., Moline, Ill.
 Oliver Chilled Plow Wks., S. Bend, Ind.
 Sidney Steel Scraper Co., Sidney, O.
 Shusser-McLean Scraper Co., Sidney, O.
 Western Wheeled Scraper Co., Aurora, Ill.
- FLAWS, ROOPER & GRADING**
 *Ted Carr & Co., Chicago.
 *Ward Plow Wks., Batavia, N. Y.
- PLUMBING SUPPLIES**
 J. B. Clow & Sons, Chicago
 Crane Co., Chicago
 Gleaner Brass Mfg. Co., Cleveland, O.
 Imperial Brass Mfg. Co., Chicago.
 J. L. Mott Iron Wks., N. Y.
 Mueller Company, Decatur, Ill.
 Rundle-Spence Mfg. Co., Milwaukee
 Walworth Mfg. Co., Boston
- PNEUMATIC CONCRETE PLACERS**
 *Ransome Concrete Machy. Co., Dunellen, N. J.
- PNEUMATIC GROUT MIXERS & PLACERS**
 *Ransome Concrete Machy. Co., Dunellen, N. J.
- POLES, STEEL STRUCTURAL**
 *Blaw-Knox Co., Pittsburgh, Pa.
 Elec. Ry. Equip. Co., Cincinnati, O.
- PORTABLE BUILDINGS**
 *Blaw-Knox Co., Pittsburgh, Pa.
 *Littleford Bros., Cincinnati, O.
 *Trascon Steel Co., Youngstown, O.
- PORTABLE STEEL DERRICKS (See Derricks, Steel Portable)**
- PORTABLE WOOD WORKERS**
 Jaeger Portable Power Corp., Detroit
- PORTLAND CEMENT (See Cement)**
- POSTHOLE DIGGERS**
 *Ransome Conc. Machy. Co., Dunellen, N.J.
 Amer. Shov. & Stamp. Co., Lorain, O.
 Baldwin Tl. Wks., Parkerburg, W. Va.
 Brown Mfg. Co., Zanesville, Ohio.
 The Buda Co., Harvey, Ill.
 Champion Tl. & Hdie. Wks., Evert, Mich.
 Columbus Bridge & Tool Corp., Columbus, Ind.
 Henry Disston & Sons, Inc., Philadelphia, Pa.
 Empire Plow Co., Cleveland, O.
 Four Wheel Drive Auto Co., Clintonville, Wis.
 Franklin Equip. Co., Monticello, Ia.
 Gibbs Mfg. Co., Canton, O.
 Gowanda Agr. Wks., Gowanda, N. Y.
 Hubbard & Co., Pittsburgh, Pa.
 Iron City Tool Works, Pittsburgh, Pa.
 Iwan Bros., South Bend, Ind.
 Klein-Logan Co., Pittsburgh, Pa.
 F. E. Kohler Co., Canton, O.
 Leetonia Tool Co., Leetonia, O.
 North Indianapolis Cradle Wks., Indianapolis, Ind.
 Ohio Cultivator Co., Bellevue, O.
 Oliver Iron & Stl. Corp., Pittsburgh, Pa.
 W. H. Oumondson, Perry, Iowa.
 Fench Fdry. & Mfg. Co., Le Mars, Ia.
 Seymour Mfg. Co., Seymour, Ind.
 G. A. Swineford Co., Canton, Ohio

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*

14 Points of Merit



INTO our line of Link-Belt Shovels we have put all the experience and skill of our designers; employed all of the superior manufacturing facilities of our modern shops. They are the best shovels we know how to build. These are the reasons why their performance has earned such nation wide acceptance by those who handle materials. Send for Catalog No. 895.

LINK-BELT COMPANY

3201

Leading manufacturers of Elevating, Conveying, and Power Transmission Machinery
CHICAGO, 300 W. Pershing Road

Offices in Principal Cities

LINK-BELT SHOVEL

VISIT OUR BOOTH AT THE ROAD SHOW—CLEVELAND, OHIO—JAN. 9-13, 1928

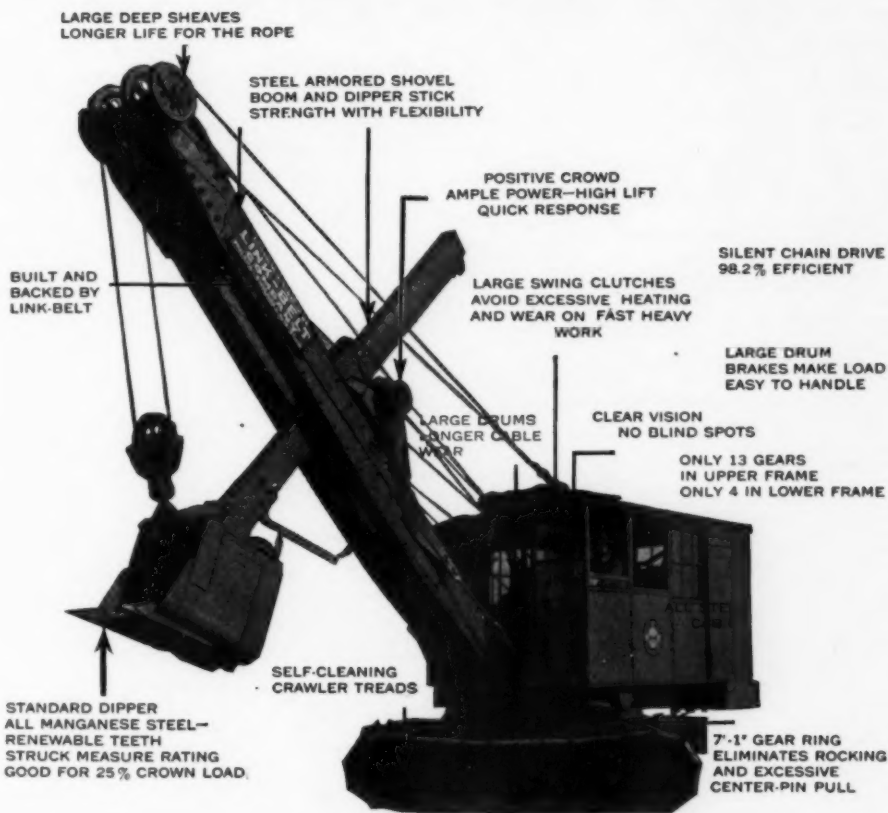
Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.

Where to Purchase

- *McKiernan-Terry Drill Co., N. Y.
 *Mead-Morrison Mfg. Co., E. Boston
 *Union Iron Wks., Inc., Hoboken, N. J.
 Industrial Wks., Bay City, Mich.
 Ldgewood Manufacturing Co., N. Y.
 McMyler Interstate Co., Cleveland, O.
- PILE-HAMMERS, STEAM**
 *Clyde Ir. Wks. Sales Co., Duluth, Minn.
 *McKiernan-Terry Drill Co., N. Y.
 *Union Iron Wks., Inc., Hoboken, N. J.
 *Wemlinger, Inc., N. Y.
 Industrial Wks., Bay City, Mich.
 Nil. Hoisting Eng. Co., Harrison, N. J.
 Vulcan Iron Wks., Chicago
- PILING, CONCRETE**
 MacArthur Conc. Pile & F'd'n. Co., N.Y.
 Raymond Conc. Pile Co., N. Y.
- PILING, INTERLOCKING STEEL**
 Bethlehem Steel Co., Bethlehem, Pa.
 Carnegie Steel Co., Pittsburgh, Pa.
- PILING, STEEL SHEET**
 *Wemlinger, Inc., N. Y.
 Bethlehem Steel Co., Bethlehem, Pa.
- PIPE CAST IRON**
 *Central Fdry. Co., N. Y.
 *U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.
 Am. Cast Ir. Pipe Co., Birmingham, Ala.
 J. B. Clow & Sons, Chicago
 Donaldson Iron Co., Emaus, Pa.
 John Fox & Co., N. Y.
 Glamorgan Pipe & Fdry. Co., Lynchburg, Va.
 Lynchburg Fdry. Co., Lynchburg, Va.
 McWane C. I. Pipe Co., Birmingham, Ala.
 Nat. C. I. Pipe Co., Birmingham, Ala.
 Warren Fdry. & Pipe Co., N. Y.
 R. D. Wood & Co., Phila., Pa.
- PIPE, CULVERT (See Culverts)**
- PIPE, LEAD**
 United Lead Company, N. Y.
- PIPE, REINFORCED CONCRETE**
 *Newark Conc. Pipe Co., Newark, N. J.
 Concrete Prod. Co., Pittsburgh, Pa.
 Core Joint Conc. Pipe Co., Baltimore
 Independent Conc. Pipe Co., Indianapolis
 Lock Joint Pipe Co., Ampere, N. J.
- PIPE, RIVETED STEEL OR IRON**
 *Gunnery & Co., Inc., Phila., Pa.
 *Jos. Honhorst Co., Cincinnati, O.
 *Littleford Bros., Cincinnati, O.
 Abendroth & Root Mfg. Co., Newburgh, N. Y.
 American Spiral Pipe Wks., Chicago
 Biggs Boiler Wks., Akron.
 Canton Culvert & Silo Co., Canton, O.
 Chatta. Boiler & Tr. Co., Chatta., Tenn.
 Chicago Bridge & Ir. Wks., Chicago
 E. Jersey Pipe Co., N. Y.
 Hamond Ir. Wks., Warren, Pa.
 R. Hardesty Mfg. Co., Denver
 Lancaster Iron Wks., Lancaster, Pa.
 Pittsburgh-Des Moines Sil. Co., Pittsburgh, Pa.
 Tippet & Wood, Phillipsburg, N. J.
 Weller Mfg. Co., Chicago
- PIPE, STEEL**
 *Republic Ir. & Sil. Co., Youngstown, O.
 Central Tube Co., Pittsburgh, Pa.
 E. Jersey Pipe Co., N. Y.
 R. Hardesty Mfg. Co., Denver
 Jones & Laughlin Sil. Co., Pittsburgh
 National Tube Co., Pittsburgh
 South Chester Tube Co., Chester, Pa.
 Spang-Chalfont & Co., Pittsburgh, Pa.
 Wheeling Sil. Corp., Wheeling, W. Va.
 Youngstown Sheet & Tube Co., Youngstown, O.
- PIPE, WOOD**
 Amer. Wood Pipe Co., Tacoma, Wash.
- Patterson-Williams Co., San Jose, Cal.
 A. G. Spalding & Bros., Chicopee, Mass.
 Cascade Pipe & Flume Co., Seattle, Wash.
 Federal Tank & Pipe Co., Seattle, Wash.
 Mich. Pipe Co., Bay City, Mich.
 Pacific Pipe & Tank Co., S. Francisco.
 Redwood Mfrs. Co., San Francisco
 Standard Wd. Pipe Co., Williamsport, Pa.
 A. Wyckoff & Sons Co., Elmira, N. Y.
- PIPE, WROUGHT IRON**
 A. M. Byers Co., Pittsburgh, Pa.
 Reading Iron Co., Reading, Pa.
- PIPE BENDING MACHINES**
 Am. Pipe Bending Mach. Co., Boston
 Walworth Mfg. Co., Boston
 Watson-Stillman Co., New York.
- PIPE COVERING**
- AIRCELL**
 *Philip Carey Co., Cincinnati, O.
 Ehret Mag. Mfg. Co., Valley Forge, Pa.
 Johns-Manville, Inc., N. Y.
 Keasbey & Mattison Co., Ambler, Pa.
 Nil. Asbestos Co., Jersey City, N. J.
 Norristown Mag. & Asb. Co., Norristown, Pa.
 Ball Mountain Co., Chicago
 H. F. Watson Co., Erie, Pa.
- 85 PER CENT MAGNESIA**
 *Philip Carey Co., Cincinnati, O.
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 Johns-Manville, Inc., N. Y.
 Keasbey & Mattison Co., Ambler, Pa.
 Norristown Mag. & Asb. Co., Norristown, Pa.
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 Redwood Mfrs. Co., San Francisco
 A. Wyckoff & Son Co., Elmira, N. Y.
- PIPE CUTTERS (See Cutters, Pipe, Hand)**
- PIPE FITTINGS**
 *Central Fdry. Co., N. Y.
 *U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.
 Amer. C. I. Pipe Co., Birmingham, Ala.
 Builders Iron Fdry., Providence, R. I.
 J. B. Clow & Sons, Chicago
 Crane Co., Chicago
 Donaldson Iron Co., Emaus, Pa.
 Lunkenheimer Co., Cincinnati, O.
 Nil. C. I. Pipe Co., Birmingham, Ala.
 Reading Sil. Casting Co., Inc., Bridgeport, Conn.
 Warren Fdry. & Pipe Co., N. Y.
 R. D. Wood & Co., Phila., Pa.
- PIPE HANDLING MACHINERY**
 Taylor Port. Sil. Derrick Co., Chicago
- PIPE JOINT COMPOUND (Sewer)**
 *Philip Carey Co., Cincinnati, O.
 *Pacific Flush Tank Co., Chi. and N. Y.
 G. K. Sales Co., Macungie, Pa.
 Leadite Company, Inc., Phila., Pa.
 Ruberoid Co., N. Y.
 Texas Co., New York
 Waring-Underwood Co., Phila., Pa.
- PIPE JOINT MATERIAL (Cast Iron)**
 Hydraulic Development Co., Boston
 The Leadite Co., Phila., Pa.
 United Lead Co., N. Y.
- PIPE PUSHERS**
 Duff Mfg. Co., Pittsburgh.
 Easy Mfg. Co., Lincoln, Neb.
 Grant Mfg. Co., Council Bluffs, Ia.
- PLAYGROUND APPARATUS**
 American Playground Device Co., Anderson, Ind.
 Chicago Gym. Equip. Co., Chicago
 Everwear Mfg. Co., Springfield, O.
 Giant Mfg. Co., Council Bluffs, Ia.
 Hill-Standard Co., Anderson, Ind.
 Fred. Medart Mfg. Co., St. Louis, Mo.
 Mitchell Mfg. Co., Milwaukee
- PLUMBS, CONTRACTORS'**
 *Austin-West'n Bd. Mach. Co., Chicago
 *Caterpillar Trac. Co., San Leandro, Cal.
 *Gallon Ir. Wks. & Mfg. Co., Gallon, O.
 *Russell Grader Mfg. Co., Minneapolis
 *Wiard Plow Co., Batavia, N. Y.
 J. D. Adams & Co., Ind'p'lis, Ind.
 American Steel Scraper Co., Sidney, O.
 Burch Corp'n., Crestline, O.
 Deere & Co., Moline, Ill.
 C. D. Edwards Mfg. Co., Albert Lee, Minn.
 International Harvester Co., Chicago
 Roderick Lean Mfg. Co., Mansfield, O.
 Moline Implement Co., Moline, Ill.
 Oliver Chilled Plow Wks., S. Bend, Ind.
 Sidney Steel Scraper Co., Sidney, O.
 Slusser-McLean Scraper Co., Sidney, O.
 Western Wheeled Scraper Co., Aurora, Ill.
- PLUMBS, ROOPER & GRADING**
 *Ted Carr & Co., Chicago.
 *Wiard Plow Wks., Batavia, N. Y.
- PLUMBING SUPPLIES**
 J. B. Clow & Sons, Chicago
 Crane Co., Chicago
 Glauber Brass Mfg. Co., Cleveland, O.
 Imperial Brass Mfg. Co., Chicago.
 J. L. Mott Iron Wks., N. Y.
 Mueller Company, Decatur, Ill.
 Rundle-Spence Mfg. Co., Milwaukee
 Walworth Mfg. Co., Boston
- PNEUMATIC CONCRETE PLACERS**
 *Ransome Concrete Machy. Co., Dunellen, N. J.
- PNEUMATIC GROUT MIXERS & PLACERS**
 *Ransome Concrete Machy. Co., Dunellen, N. J.
- POLES, STEEL STRUCTURAL**
 *Blaw-Knox Co., Pittsburgh, Pa.
 Elec. Ry. Equip. Co., Cincinnati, O.
- PORTABLE BUILDINGS**
 *Blaw-Knox Co., Pittsburgh, Pa.
 *Littleford Bros., Cincinnati, O.
 Truscon Steel Co., Youngstown, O.
- PORTABLE STEEL DERRICKS (See Derricks, Steel Portable)**
- PORTABLE WOOD WORKERS**
 Jaeger Portable Power Corp., Detroit
- PORTLAND CEMENT (See Cement)**
- POSTHOLE DIGGERS**
 *Ransome Conc. Machy. Co., Dunellen, N.J.
 Amer. Shov. & Stamp Co., Lorain, O.
 Baldwin Tr. Wks., Parkersburg, W. Va.
 Brown Mfg. Co., Zanesville, Ohio.
 The Buda Co., Harvey, Ill.
 Champion Tr. & Hdlg. Wks., Evert, Mich.
 Columbus Handle & Tool Corp., Columbus, Ind.
 Henry Disston & Sons, Inc., Philadelphia, Pa.
 Empire Plow Co., Cleveland, O.
 Four Wheel Drive Auto Co., Clintonville, Wis.
 Franklin Equip. Co., Monticello, Ia.
 Gibbs Mfg. Co., Canton, O.
 Gowanda Agr. Wks., Gowanda, N. Y.
 Hubbard & Co., Pittsburgh, Pa.
 Iron City Tool Works, Pittsburgh, Pa.
 Iwan Bros., South Bend, Ind.
 Klein-Logan Co., Pittsburgh, Pa.
 F. E. Kohler Co., Canton, O.
 Leetonia Tool Co., Leetonia, O.
 North Indianapolis Cradle Wks., Indianapolis, Ind.
 Ohio Cultivator Co., Bellevue, O.
 Oliver Iron & Sil. Corp., Pittsburgh, Pa.
 W. H. Osmondson, Perry, Iowa.
 Pech Fdry. & Mfg. Co., Le Mars, Ia.
 Seymour Mfg. Co., Seymour, Ind.
 G. A. Swineford Co., Canton, Ohio

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14 Points of Merit



INTO our line of Link-Belt Shovels we have put all the experience and skill of our designers; employed all of the superior manufacturing facilities of our modern shops. They are the best shovels we know how to build. These are the reasons why their performance has earned such nation wide acceptance by those who handle materials. Send for Catalog No. 895.

LINK-BELT COMPANY

3201

Leading manufacturers of Elevating, Conveying, and Power Transmission Machinery
CHICAGO, 300 W. Pershing Road

Offices in Principal Cities

LINK-BELT SHOVEL

VISIT OUR BOOTH AT THE ROAD SHOW—CLEVELAND, OHIO—JAN. 9-13, 1928

Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.

Where to Purchase

Verona Tool Works, Pittsburgh, Pa.
Warren Tool & Forge Co., Warren, O.
Wood Shovel & Tool Co., Piqua, Ohio
Western St. & Ir. Wks., De Pere, Wis.
Wyoming Shovel Works, Wyoming, Pa.

POWDER (See Explosives)

POWER PLANTS, INDUSTRIAL

*Alamo Engine Co., Hillsdale, Mich.
*Climax Eng. Co., Clinton, Ia.
*Continental Motors Corp., Muskegon, Mich.
*Hercules Motors Corp., Canton, O.
*Waukesha Motor Co., Waukesha, Wis.
Buda Co., Harvey, Ill.
Hinkley Motors, Inc., Detroit
Sanderson-Cyclone Drill Co., Orrville, O.
Serval Mfg. Co., Evansville, Ind.
Wiaconsin Motor Co., Milwaukee

PULLING MACHINES

John Waldron Corp., New Brunswick, N. J.

PUMP JACKS

*John Lauson Mfg. Co., New Holstein, Wis.

PUMPERS, FORD

American Steam Pump Co., Battle Creek, Mich.
Jaeger Portable Machy. Co., Detroit.

PUMPS, AIR LIFT

*American Steam Pump Co., Battle Creek, Mich.

*Sullivan Mach Co., Chicago
Chicago Pneum. Tool Co., New York
Indiana Air Pump Co., Indianapolis
Ingersoll-Rand Co., N. Y.

PUMPS, CENTRIFUGAL

*Aldrich Pump Co., Allentown, Pa.
*American Steam Pump Co., Battle Creek, Mich.

*Cook Motor Co., Delaware, O.
*Domestic Eng. & Pump Co., Shippensburg, Pa.

*Humphreys Mfg. Co., Mansfield, O.
*Keystone Driller Co., Beaver Falls, Pa.
*Novo Engine Co., Lansing, Mich.

Allis-Chalmers Mfg. Co., Milwaukee
Amer. Well Works, Aurora, Ill.

Aurora Pump & Mfg. Co., Aurora, Ill.
Barnes Mfg. Co., Mansfield, O.
Bethlehem Steel Co., Bethlehem, Pa.

Buffalo Stm. Pump Co., Buffalo.
A. B. Cameron Stm. Pump Wks., N. Y.
Chicago Pump Co., Chicago

Dayton-Dowd Co., Quincy, Ill.
Dean Bros. Co., Indianapolis

De Laval Stm. Turb. Co., Trenton, N. J.
Erie Pump & Eng. Wks., Medina, N. Y.

Evinrude Motor Co., Milwaukee
Fairbanks, Morse & Co., Chicago
General Elec. Co., Schenectady

Goulds Pumps, Inc., Seneca Falls, N. Y.
Indiana Air Pump Co., Indianapolis
Ingersoll-Rand Co., New York

LeCourtenay Co., Newark, N. J.
Manitowoc Iron Wks., Manitowish, Mich.
Morris Mach. Wks., Baldwinville, N. Y.

Rumsey Pump Co., Seneca Falls, N. Y.
United Iron Wks., Inc., K. City, Mo.
Warren Stm. Pump Co., Warren, Mass.

Weinman Pump Mfg. Co., Columbus, O.
Wheeler Condenser & Eng. Co., Carteret, N. J.

Worthington Pump & Mch. Corp., N. Y.
Yeomans Bros. Co., Chicago

PUMPS, CONTRACTORS'

*Aldrich Pump Co., Allentown, Pa.
*American Steam Pump Co., Battle Creek, Mich.

*Domestic Eng. & Pump Co., Shippensburg, Pa.

*Humphreys Mfg. Co., Mansfield, O.

*John Lauson Mfg. Co., New Holstein, Wis.

*Kinney Mfg. Co., Boston

*Novo Engine Co., Lansing, Mich.

*Standard Scale & Supply Co., Pittsburgh

*Waukesha Motor Co., Waukesha, Wis.

Allis-Chalmers Mfg. Co., Milwaukee

Amer. Well Wks., Aurora, Ill.

Aurora Pump & Mfg. Co., Aurora, Ill.

Barnes Mfg. Co., Mansfield, O.

Buda Co., Harvey, Ill.

A. S. Cameron Stm. Pump Wks., N. Y.

Ralph B. Carter Co., N. Y.

C. H. & E. Mfg. Co., Milwaukee

Construction Machy. Co., Waterloo, Ia.

Dayton-Dowd Co., Quincy, Ill.

Deming Co., Salem, O.

Emerson Pump & Valve Co., Alexandria, Va.

Erie Pump & Eng. Wks., Medina, N. Y.

Fairbanks, Morse & Co., Chicago

Goulds Pumps, Inc., Seneca Falls, N. Y.

Ingersoll-Rand Co., New York

Jaeger Portable Power Corp., Detroit

LeCourtenay Co., Newark, N. J.

Morris Mach. Wks., Baldwinville, N. Y.

F. E. Myers & Bro. Co., Ashland, O.

Pulsometer Steam Pump Co., N. Y.

Rumsey Pump Co., Seneca Falls, N. Y.

Van Noughs Mach. Wks., Albany, N. Y.

Waldo Bros. & Bond Co., Boston, Mass.

PUMPS, DEEP WELL

*Aldrich Pump Co., Allentown, Pa.

*American Steam Pump Co., Battle Creek, Mich.

*Domestic Eng. & Pump Co., Shippensburg, Pa.

*Humphreys Mfg. Co., Mansfield, O.

*Keystone Driller Co., Beaver Falls, Pa.

*Novo Engine Co., Lansing, Mich.

Amer. Well Wks., Aurora, Ill.

Barnes Mfg. Co., Mansfield, O.

A. S. Cameron Stm. Pump Wks., N. Y.

A. D. Cook, Inc., Lawrenceburg, Ind.

Dean Bros. Co., Indianapolis

Deming Co., Salem, O.

Goulds Pumps, Inc., Seneca Falls, N. Y.

Harris Air Pump Co., Indianapolis

Indiana Air Pump Co., Indianapolis

Ingersoll-Rand Co., New York

Layne & Bowler Co., Memphis, Tenn.

A. Y. McDonald Mfg. Co., Dubuque, Ia.

Midwest Eng. Co., Indianapolis, Ind.

F. E. Myers & Bro. Co., Ashland, O.

Rumsey Pump Co., Seneca Falls, N. Y.

United Iron Wks., Inc., K. City, Mo.

Weinman Pump Mfg. Co., Columbus, O.

PUMPS, DIAPHRAGM

*Domestic Eng. & Pump Co., Shippensburg, Pa.

*Humphreys Mfg. Co., Mansfield, O.

*Novo Engine Co., Lansing, Mich.

*Witte Eng. Wks., Kansas City, Mo.

Aurora Pump & Mfg. Co., Aurora, Ill.

Barnes Mfg. Co., Mansfield, O.

Ralph B. Carter Co., N. Y.

C. H. & E. Mfg. Co., Milwaukee

Construction Machy. Co., Waterloo, Ia.

Deming Co., Salem, O.

Dorr Co., N. Y.

Goulds Pumps, Inc., Seneca Falls, N. Y.

Waldo Bros. & Bond Co., Boston, Mass.

PUMPS, DREDGING

*Novo Engine Co., Lansing, Mich.

Ellicott Mach. Corp., Baltimore, Md.

Erie Pump & Eng. Co., Medina, N. Y.

Ingersoll-Rand Co., New York

Morris Mach. Wks., Baldwinville, N. Y.

PUMPS, GASOLINE AND OIL

*Kinney Mfg. Co., Boston

S. F. Bowser & Co., Inc., Ft. Wayne, Ind.

Gilbert & Barker Mfg. Co., Springfield, Mass.

Ingersoll-Rand Co., New York

Tokheim Oil Tank & Pump Co., Ft. Wayne, Ind.

Wayne Tank & Pump Co., Ft. Wayne, Ind.

PUMPS, HIGH PRESSURE

Evinrude Motor Co., Milwaukee.

PUMPS, PORTABLE

*American Steam Pump Co., Battle Creek, Mich.

*Humphreys Mfg. Co., Mansfield, O.

*John Lauson Mfg. Co., New Holstein, Wis.

Evinrude Motor Co., Milwaukee.

Jaeger Portable Power Corp., Detroit

PUMPS, POWER

*Aldrich Pump Co., Allentown, Pa.

*American Steam Pump Co., Battle Creek, Mich.

*Domestic Eng. & Pump Co., Shippensburg, Pa.

*Humphreys Mfg. Co., Mansfield, O.

*Kinney Mfg. Co., Boston

*Novo Eng. Co., Lansing, Mich.

*Waukesha Motor Co., Waukesha, Wis.

Alamo Iron Wks., San Antonio, Tex.

Allis-Chalmers Mfg. Co., Milwaukee

Amer. Well Wks., Aurora, Ill.

Aurora Pump & Mfg. Co., Aurora, Ill.

Barnes Mfg. Co., Mansfield, O.

Chicago Pump Co., Chicago

Dayton-Dowd Co., Quincy, Ill.

De Laval Stm. Turb. Co., Trenton, N. J.

Deming Co., Salem, O.

Evinrude Motor Co., Milwaukee.

Fairbanks, Morse & Co., Chicago

Gardner Governor Co., Quincy, Ill.

Goulds Pumps, Inc., Seneca Falls, N. Y.

Indiana Air Pump Co., Indianapolis

Ingersoll-Rand Co., New York

Lawrence Mach. Co., Lawrence, Mass.

LeCourtenay Co., Newark, N. J.

F. E. Myers & Bro. Co., Ashland, O.

Northern Fire App. Co., Minneapolis.

Rumsey Pump Co., Seneca Falls, N. Y.

Weinman Pump Mfg. Co., Columbus, O.

Worthington Pump & Mch. Corp., N. Y.

Yeomans Bros. Co., Chicago.

PUMPS, SEWAGE

*American Steam Pump Co., Battle Creek, Mich.

*Amer. Well Wks., Aurora, Ill.

*Humphreys Mfg. Co., Mansfield, O.

*Pacific Flush Tank Co., Chi. and N. Y.

Barnes Mfg. Co., Mansfield, O.

A. S. Cameron Stm. Pump Wks., N. Y.

Chicago Pump Co., Chicago.

Fairbanks, Morse & Co., Chicago.

Ingersoll-Rand Co., New York.

Sanitation Corp., N. Y.

Warren Stm. Pump Co., Warren, Mass.

White Co., Cleveland, O.

Yeomans Bros. Co., Chicago.

PUMPS, TAR AND ASPHALT

*Kinney Mfg. Co., Boston.

RADIATORS FOR GASOLINE ENGINES

McCord Radiator Mfg. Co., Detroit.

Modine Mfg. Co., Racine, Wis.

Racine Radiator Co., Racine, Wis.

RAIL AND RAIL JOINTS

*Easton Car & Const. Co., Easton, Pa.

Bethlehem Steel Co., Bethlehem, Pa.

Carnegie Steel Co., Pittsburgh, Pa.

Koppel Ind. Car & Equip. Co., Koppel, Pa.

Sweet's Steel Co., Williamsport, Pa.

RAILROAD DITCHERS (See Excavators, Ditch and Trench)

RECORDERS, WATER STAGE

Bristol Co., Waterbury, Conn.

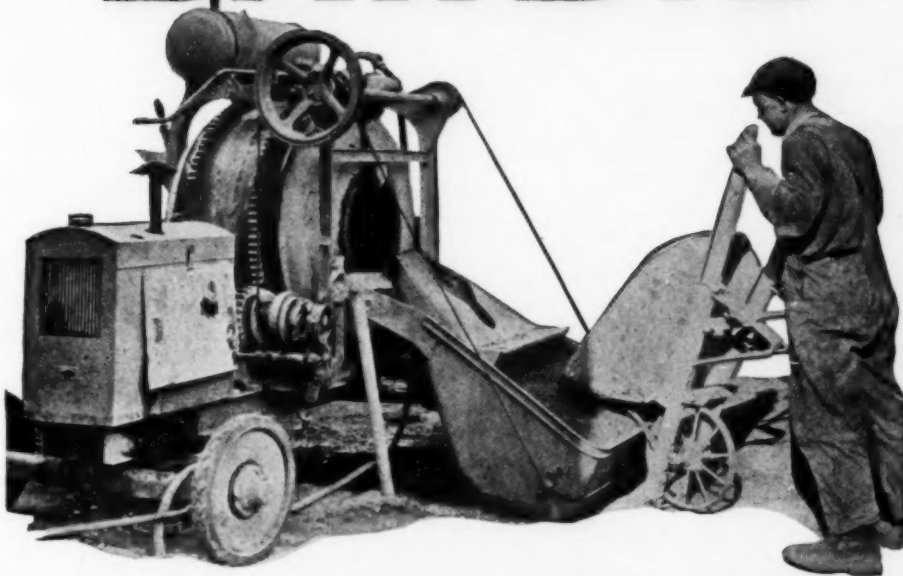
Builders Iron Fdry., Providence, R. I.

W. & L. E. Gurley, Troy, N. Y.

REFRIGERATING MACHINERY (See Ice Making Machinery)

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CONTRACTORS AND ENGINEERS MONTHLY

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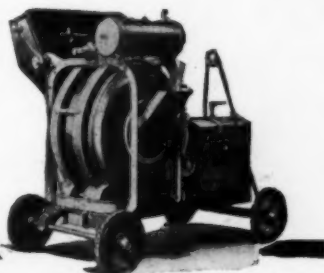
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Sales Offices and Service Warehouses in all principal cities
Foreign Department—Room 1370, 50 Church St., New York City
Mexico—P. O. Lapun, Cinco De Mayo 21, Mexico. D.F.

Dandie Mixer—5-S, 7-S:—5-S single cylinder, 7-S two or four cylinder gasoline engine. Power charging skip, or low charging hopper and platform. Rubber tired steel disc wheels or steel rimmed wheels. Complies with A. G. C. Standards.



A-4041

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Where to Purchase

REINFORCING, CONCRETE (See Concrete Reinforcement)

RIVETERS, PNEUMATIC

Alliance Machine Co., Alliance, O.
Chicago Pneum. Tool Co., New York
Cleveland Pneum. Tool Co., Cleveland, O.
Hanna Eng. Works, Chicago.
Helwig Mfg. Co., St. Paul, Minn.
Independent Pneum. Tool Co., Chicago.
Ingersoll-Rand Co., N. Y.
Wm. H. Keller, Inc., Grand Haven, Mich.
Shepherd Electric Crane & Hoist Co., Montour Falls, N. Y.
Southwark Fdry. & Mach. Co., Phila.
Watson-Stillman Co., N. Y.

RIVET SETS

Chicago Pneum. Tool Co., New York.
Cleveland Pneum. Tool Co., Cleveland, O.
Dunbar Drop Forge Co., Chicago.
Independent Pneum. Tool Co., Chicago.
Ingersoll-Rand Co., N. Y.

ROAD GRADERS, HORSE OR TRACTOR DRAWN

*Austin-West'n Rd. Mch. Co., Chicago.
*Baker Mfg. Co., Springfield, Ill.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Good Rds. Mch. Co., Kennett Sq., Pa.
*Rome Mfg. Co., Rome, N. Y.
*Russell Grader Mfg. Co., Minneapolis.
*Gustav Schaefer Wagon Co., Cleveland.
J. D. Adams & Co., Indianapolis, Ind.
Austin Mfg. Co., Chicago.
Beach Mfg. Co., Charlotte, Mich.
C. D. Edwards Mfg. Co., Albert Lea, Minn.
Gilbert Mfg. Co., Aberdeen, S. D.
Killefer Mfg. Co., Los Angeles.
Klauer Mfg. Co., Dubuque, Iowa.
Little Red Wagon Mfg. Co., Omaha.
Lyle Culv. & Rd. Equip. Co., Minneapolis.
N. S. Monroe & Sons, Arthur, Ill.
Owensboro Ditcher & Grader Co., Owensboro, Ky.
Stockland Rd. Mach. Co., Minneapolis.
Western Wheeled Scraper Co., Aurora, Ill.

ROAD GRADERS, POWER

*Acme Road Mach. Co., Frankfort, N. Y.
*Austin-West'n Rd. Mch. Co., Chicago.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Good Rds. Mch. Co., Kennett Sq., Pa.
*W. A. Ridell Co., Bucyrus, O.
*Russell Grader Mfg. Co., Minneapolis.
*Spears-Wells Mach. Co., Oakland, Cal.
Gilbert Mfg. Co., Aberdeen, S. D.
Little Red Wagon Mfg. Co., Omaha.
Shaw-Enochs Tractor Co., Minneapolis.
Wehr Co., Milwaukee.

ROAD MAINTAINERS, POWER

*Spears-Wells Mach. Co., Oakland, Cal.

ROAD OILS (See Oils, Road)

ROAD OILERS

*Austin-West'n Rd. Mch. Co., Chicago.
*Good Rds. Mch. Co., Kennett Sq., Pa.
*Kinney Mfg. Co., Boston.
*Mack Trucks, Inc., N. Y.
*Spears-Wells Mach. Co., Oakland, Cal.
E. D. Etnyre & Co., Oregon, Ill.
Municipal Sup. Co., So. Bend, Ind.
White Co., Cleveland

ROAD FLOWS

*Spears-Wells Mach. Co., Oakland, Cal.

ROAD SCRAPER

*Acme Rd. Mach. Co., Frankfort, N. Y.
*Austin-West'n Rd. Mch. Co., Chicago.
*Baker Mfg. Co., Springfield, Ill.
*Euclid Cr. & Hst. Co., Euclid Village, O.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Good Rds. Mch. Co., Kennett Sq., Pa.
*La Plant-Chaste Mfg. Co., Cedar Rapids, Ia.

*Miami Trailer-Scraper Co., Troy, O.
*Russell Grader Mfg. Co., Minneapolis.
*Gustav Schaefer Wagon Co., Cleveland, O.
J. D. Adams & Co., Indianapolis, Ind.
Beach Mfg. Co., Charlotte, Mich.
Davenport Mfg. Co., Los Angeles, Cal.
Gilbert Mfg. Co., Aberdeen, S. D.
Killefer Mfg. Co., Los Angeles.
Roderick Lean Co., Mansfield, O.
Little Red Wagon Mfg. Co., Omaha.
Lyle Culv. & Rd. Equip. Co., Minneapolis.
Miskin Scraper Works, Ucon, Ida.
Root Spring Scraper Co., Kalamazoo.
Shaw-Enochs Tractor Co., Minneapolis.
Sidney Steel Scraper Co., Sidney, O.
Stockland Rd. Mch. Co., Minneapolis.
Western Wheeled Scraper Co., Aurora, Ill.

ROAD AND PAVING MACHINERY

*Acme Rd. Mach. Co., Frankfort, N. Y.
*Austin-West'n Rd. Mch. Co., Chicago.
*Baker Mfg. Co., Springfield, Ill.
*Barber Asphalt Co., Phila., Pa.
*Blaw-Knox Co., Pittsburgh, Pa.
*Buffalo-Springfield Roller Co., Springfield, O.
*Caterpillar Tractor Co., San Leandro, Cal. and Peoria, Ill.
*Connery & Co., Inc., Phila., Pa.
*Cleveland Tractor Co., Cleveland, O.
*Easton Car & Const. Co., Easton, Pa.
*Euclid Cr. & Hst. Co., Euclid Village, O.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Good Rds. Mach. Co., Kennett Sq., Pa.
*Geo. Hais Mfg. Co., N. Y.
*Heltzel St. Form & Ir. Co., Warren, O.
*Jos. Honhorst Co., Cincinnati, O.
*Kinney Mfg. Co., Boston.
*Koehring Co., Milwaukee.
*Lakewood Eng. Co., Cleveland, O.
*Littleford Bros., Cincinnati, O.
*Mack Trucks, Inc., N. Y.
*Russell Grader Mfg. Co., Minneapolis.
*Gustav Schaefer Wagon Co., Cleveland.
*T. L. Smith Co., Milwaukee.
*Spears-Wells Mch. Co., Oakland, Cal.
J. D. Adams & Co., Indianapolis, Ind.
Beach Mfg. Co., Charlotte, Mich.
Chausse Oil Burner Co., Elkhart, Ind.
F. D. Cummer & Son Co., Cleveland, O.
C. D. Edwards Mfg. Co., Albert Lea, Minn.
Equitable Asph. Maint. Co., Kans. C. Mo.
Erie Mach. Shops, Erie, Pa.
J. D. Farney Mfg. Co., Cleveland, O.
Gilbert Mfg. Co., Aberdeen, S. D.
Little Red Wagon Mfg. Co., Omaha.
Shaw-Enochs Tractor Co., Minneapolis.
Slusser-McLean Scraper Co., Sidney, O.
Universal Rd. Mch. Co., Kingston, N. Y.

ROAD AND PAVING ROLLERS

*Acme Road Mach. Co., Frankfort, N. Y.
*Austin-West'n Rd. Mch. Co., Chicago.
*Barber Asphalt Co., Phila., Pa.
*Buffalo-Springfield Roller Co., Springfield, O.
*Gallon Ir. Wks. & Eng. Co., Gallon, O.
*Good Rds. Mach. Co., Kennett Sq., Pa.
*Huber Mfg. Co., Marion, O.
*Kinney Standards, Inc., Brooklyn, N. Y.
Austin Mfg. Co., Chicago.
Beach Mfg. Co., Charlotte, Mich.
J. I. Case Threshing Mach. Co., Racine, Wis.
Erie Mach. Shops, Erie, Pa.
Horst & Strieter Co., Davenport, Ia.
Wehr Co., Milwaukee.

ROCK CRUSHERS AND PULVERIZERS (See Crushers)

ROCK DRILLS (See Drills, Rock)

ROLLERS, LAWN, TRACTOR POWER
*Kinney Standards, Inc., Brooklyn, N. Y.

ROOFING, ASBESTOS, ASPHALT, COMPOSITION, TILE, ETC.

*Barber Asphalt Co., Phila., Pa.
*Barrett Co., N. Y.
*Phillip Caray Co., Cincinnati, O.
*Standard Oil Co. (Indiana), Chicago.
Amer. Cem. Tile Mfg. Co., Pittsburgh.
Atlantic Ref. & Asph. Corp., Phila., Pa.
Beaver Prod. Co., Inc., Buffalo, N. Y.
Bird & Son, Inc., E. Walpole, Mass.
Certain-teed Products Corp., N. Y.
Chatfield Mfg. Co., Cincinnati, O.
Edwards Mfg. Co., Cincinnati, O.
Euclid Chemical Co., Cleveland.
Flintkote Co., Boston.
Johns-Manville, Inc., N. Y.
Keystone Roofing Mfg. Co., York, Pa.
The Lohon Co., Chicago.
F. J. Lewis Mfg. Co., Chicago.
Nat'l Roofing Co., Tonawanda, N. Y.
Nat'l Sheet Metal Roofing Co., Jersey City, N. J.
Ruberoid Co., N. Y.
Sall Mountain Co., Chicago.
Sifo Prod. Co., St. Paul, Minn.
L. Sonneborn & Sons, Inc., N. Y.
Texas Co., N. Y.
Western Elaterite Roofing Co., Denver.

ROOFING, METAL

*Truscon Steel Co., Youngstown, O.
Amer. Rolling Mill Co., Middletown, O.
Amer. Sheet & Tin Plate Co., Pittsb'h.
Central Alloy Stl. Corp., Massillon, O.
Edwards Mfg. Co., Cincinnati, O.
Klauer Mfg. Co., Dubuque, Ia.
Milwaukee Corr. Co., Milwaukee.
Republic Ir. & Stl. Co., Youngstown, O.
Youngstown Sheet & Tube Co., Youngtown, O.

ROOFING KETTLES (See Kettles)

ROOTERS

*Ted Carr & Co., Chicago.
Lakewood Eng. Co., Cleveland.

ROPE, MANILA

Amer. Mfg. Co., B'klyn, N. Y.
Columbian Rope Co., Auburn, N. Y.
Cupples Cordage Co., B'klyn, N. Y.
Hooven & Allison Co., Xenia, O.
R. A. Kelly Co., Xenia, O.
N. Bedford Cordage Co., N. Bedford, Mass.
Peoria Cordage Co., Peoria, Ill.
Plymouth Cordage Co., N. Plymouth, Mass.
Portland Cordage Co., Portland, Ore.
Tubbs Cordage Co., San Francisco.
Wall Rope Wks., N. Y.
Waterbury Co., N. Y.
Whitlock Cordage Co., N. Y.

ROPE, WIRE, HOISTING, HAULAGE

*American Steel & Wire Co., Chicago.
*Wimspott Wire Rope Co., W'msport, Pa.
Amer. Cable Co., Inc., N. Y.
Broderick & Bascom Rope Co., St. Louis, Mo.
Fischer & Hayes Rope & Steel Co., Chicago.
Hazard Mfg. Co., Wilkesbarre, Pa.
A. Leechen & Sons Rope Co., St. Louis.
Macwhite Co., Kenosha, Wis.
J. A. Korblyng's Sons Co., Trenton, N. J.
Upson-Walton Co., Cleveland, O.
Waterbury Co., N. Y.
Wickwire Spencer Steel Co., N. Y.

RUBBER TIRES (See Tires)

RULES

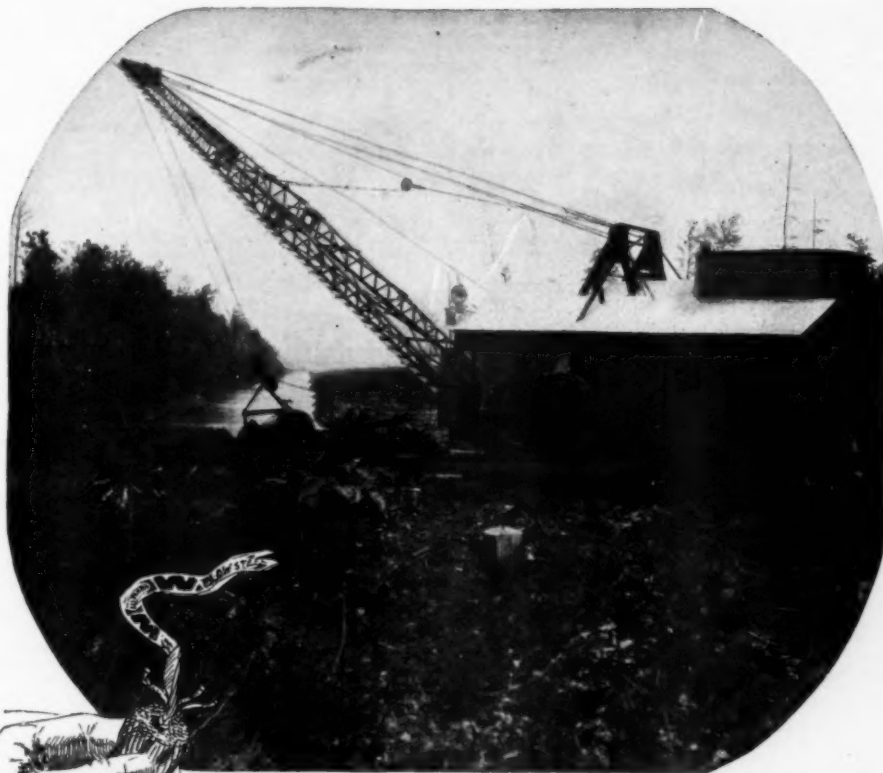
*Lufkin Rule Co., Saginaw, Mich.

SALAMANDERS

*Aeroll Burner Co., West New York, N. J.
*General Wheelbarrow Co., Akron, O.
*Jos. Honhorst Co., Cincinnati, O.
*Littleford Brothers, Cincinnati, O.
Hauck Mfg. Co., B'klyn, N. Y.
Jackson Mfg. Co., Harrisburg.

SAFETY TREADS (See Treads, Safety)

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*



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—where the swish and bang of ponderous machinery sounds like an oncoming storm—there is where you'd better know what grade of rope you're using. Know in a way that only WILLIAMSPORT provides, Factory Certified—Telfax Tape proof. Chance-taking under these conditions may knock profits into a "cocked hat." The difference between profit and loss has kept many a man from buying that new equipment.

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is the only wire rope made, the grade of which is marked in plain English. This protection to you is worth more than the wire rope cost. Don't let carelessness enter into your daily work. Know what you are using.

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SAW HORSES

*Everhot Mfg. Co., Maywood, Ill.

SAW RIGS, PORTABLE

*Amer. Saw Mill Mach. Co., Hackettstown, N. J.
*Witte Eng. Wks., Kans. City, Mo.
Beach Mfg. Co., Montross, Pa.
C. H. & E. Mfg. Co., Milwaukee.
Knickerbocker Co., Jackson, Mich.
Leach Co., Oakbrook, Wis.
Jones Superior Mach. Co., Chicago.

SAWS, HAND, POWER

*F. L. Rogers & Co., Chicago.
*Witte Eng. Wks., Kans. City, Mo.
Electro-Magnetic Tool Co., Chicago.
Flexway Corp., Cincinnati, O.
Ingersoll-Rand Co., New York
Michel Elec. Hand Saw Co., Chicago.
Porter Cable Mach. Co., Syracuse
Wappat Gear Wks., Pittsburgh, Pa.

SCARIFIERS

*Acme Rd. Mach. Co., Frankfort, N. Y.
*Austin-West'n. Rd. Mch. Co., Chicago
*Barber Asphalt Co., Phila., Pa.
*Buffalo-Springfield Roller Co., Springfield, O.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Good Rds. Mach. Co., Kennett Sq., Pa.
*Huber Mfg. Co., Marion, O.
*Rome Mfg. Co., Rome, N. Y.
*Russell Grader Mfg. Co., Minneapolis.
Austin Mfg. Co., Chicago.
C.D. Edwards Mfg. Co., Albert Lea, Minn.
Klauer Mfg. Co., Dubuque, Iowa.
Universal Rd. Mch. Co., Kingston, N.Y.

SCARIFIERS, TEETH FOR

*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Russell Grader Mfg. Co., Minneapolis.
Shunk Mfg. Co., Bucyrus, O.

SCOOPS, SKIMMER & TRENCH

*Bay City Dr. Wks., Bay City, Mich.
*Keystone Driller Co., Beaver Falls, Pa.

SCRAPERS, DRAGLINE

*Erie Steam Shovel Co., Erie, Pa.
*Link-Belt Co., Chicago.
*Russell Grader Mfg. Co., Minneapolis.
*Sauerman Bros., Chicago.
Austin Mfg. Co., Chicago.
Beach Mfg. Co., Charlotte, Mich.

SCRAPERS, POWER DRAG

*Erie Steam Shovel Co., Erie, Pa.
*Russell Grader Mfg. Co., Minneapolis.
*Sauerman Bros., Chicago.
Austin Mfg. Co., Chicago.

SCRAPERS, ROAD (See Road Scrapers)

SCRAPERS, SELF-LOADING

*Baker Mfg. Co., Springfield, Ill.
*Euclid Cr. & Hst. Co., Euclid Village, O.
*Miami Trailer-Scraper Co., Troy, O.
*Russell Grader Mfg. Co., Minneapolis.
*Gustav Schaefer Wagon Co., Cleveland.
Davenport Mfg. Co., Los Angeles, Cal.
Perry Co., Sidney, Ohio.
Roderick Lean Co., Mansfield, O.
Shaw-Enochs Tractor Co., Minneapolis.

SCREENS, SAND, GRAVEL AND COAL

*Acme Road Mach. Co., Frankfort, N. Y.
*Atlas Eng. Co., Milwaukee, Wis.
*Austin-Western Rd. Mch. Co., Chicago.
*Chain Belt Co., Milwaukee, Wis.
*Chicago Automatic Conv. Co., Chicago.
*Gallon Ir. Wks. & Mfg. Co., Gallon, O.
*Good Rds. Mch. Co., Kennett Sq., Pa.
*Halse Mfg. Co., N. Y.
*Link-Belt Co., Chicago.
*Littleford Bros., Cincinnati, O.
*Russell Grader Mfg. Co., Minneapolis.
*Smith Eng. Wks., Milwaukee
*Allis-Chalmers Mfg. Co., Milwaukee.
Austin Mfg. Co., Chicago.
C. O. Bartlett & Snow Co., Cleveland, O.
Beach Mfg. Co., Charlotte, Mich.
Brown Htg. Mach. Co., Cleveland, O.

Deister Concentrator Co., Ft. Wayne, Ind.

Gifford-Wood Co., Hudson, N. Y.

Hendrick Mfg. Co., Carbondale, Pa.

Jeffrey Mfg. Co., Columbus, O.

Lyle Culv. & Rd. Equip. Co., Minneapolis, Minn.

Morrow Mfg. Co., Wellston, O.

Newaygo Eng. Co., Newaygo, Mich.

New Holland Mch. Co., N. Holland, Pa.

New Jersey Wire Cloth Co., Trenton, N. J.

Robins Conv. Belt Co., N. Y.

H. B. Sackett Screen & Chute Co., Chicago.

Universal Crusher Co., Cedar Rapids, Ia.

Universal Rd. Mach. Co., Kingston, N.Y.

Webster Mfg. Co., Chicago.

Weller Mfg. Co., Chicago.

Wickwire Spencer Steel Co., N. Y.

SCREENS, SEWAGE

*Link-Belt Co., Philadelphia.
Dorr Co., New York.
Green Bay Fdry. & Mach. Wks., Green Bay, Wis.
Sanitation Corp'n., N. Y.
Simplex Ejector Co., Chicago.

SEWAGE DISINFECTION

*Wallace & Tiernan Co., Inc., Newark, N. J.

SEWAGE DISPOSAL APPARATUS

*Link-Belt Co., Chicago.
*Pacific Flush Tank Co., Chicago & N. Y.
Dorr Co., N. Y.
Sanitation Corp'n., N. Y.
Simplex Ejector Co., Chicago.

SEWAGE EJECTORS

*Pacific Flush Tank Co., Chicago & N. Y.
Sanitation Corp., N. Y.
Simplex Ejector Co., Chicago.
Yeomans Bros. Co., Chicago.

SEWAGE PUMPS (See Pumps)

SEWER BLOCKS, SEGMENT

American Vit. Products Co., Akron, O.
Cannelton Sewer Pipe Co., Cannelton, Ind.
Denver Sewer Pipe & Clay Co., Denver, Col.

W. S. Dickey Clay Mfg. Co., Kansas City, Mo.
Evans & Howard Fire Brick Co., St. Louis, Mo.

Laclede Christy Clay Prod. Co., St. Louis, Mo.

Macomb Sewer Pipe Wks., Macomb, Ill.

Pacific Clay Prod. Co., L. Angeles, Cal.

Red Wing Sewer Pipe Co., Red Wing, Minn.

Robinson Clay Prod. Co., Akron, O.

Standard Fire Brick & Sewer Pipe Co., Pueblo, Col.

SEWER BRACES

*Templeton, Kenly & Co., Chicago

SEWER CLEANING APPARATUS

Atia Corp., New York.
F. Bissell Co., Toledo, O.
Champion Corp., Hammond, Ind.
Self Propelling Nozzle Co., N. Y.
Turbine Sewer Mach. Co., Milwaukee.

SEWER PIPE AND DRAIN TILE

American Vit. Prod. Co., Akron, O.
Blackmer & Post Pipe Co., St. Louis.
Wm. E. Dee Co., Chicago.
Denver Sewer Pipe & Clay Co., Denver, Col.
W. S. Dickey Clay Mfg. Co., K. City, Mo.
Evans & Howard Fire Brick Co., St. Louis.
Logan Clay Prod. Co., Logan, O.
Ohio Vit. Pipe Co., Uhrichsville, O.
Patton Clay Mfg. Co., Patton, Pa.
Red Wing Sewer Pipe Co., Red Wing, Minn.
Robinson Clay Prod. Co., Akron, O.
Streator Clay Mfg. Co., Streator, Ill.

SEWER PIPE FORMS

*Heltzel Stl. Form & Ir. Co., Warren, O.

SEWER RODS

F. Bissell Co., Toledo, O.
Champion Corp., Hammond, Ind.
Luck Sewer Equip. Co., Chicago.
Turbine Sewer Mach. Co., Milwaukee.

SHARPENERS, DRILL STEEL

*Denver Rock Drill Mfg. Co., Denver, Col.
*Hardsoc Wonder Dr. Co., Ottumwa, Ia.
*Sullivan Machy Co., Chicago
Ingersoll-Rand Co., New York

SHINGLES, METAL

Aluminum Co. of Am., Pittsburgh, Pa.
Berger Mfg. Co., Canton, O.
Edwards Mfg. Co., Cincinnati, O.
Klauer Mfg. Co., Dubuque, Ia.
Milwaukee Corrugating Co., Milwaukee.
Nat'l Sheet Metal Roofing Co., Jersey City, N. J.
Newport Rolling Mill Co., Newport, Ky.
Penn Metal Co., Boston.
Tiffin Art Metal Co., Tiffin, O.
Wheeling Metal Mfg. Co., Wheeling, W. Va.

SEWER PIPE JOINT COMPOUNDS

*Pacific Flush Tank Co., Chicago & N. Y.
G. K. Sales Agency, Macungie, Pa.
Ruberoid Co., N. Y.
Serviced Prod. Corp., Chicago
Cont. Form Co., Inc., Syracuse, N. Y.
Quinn Wire & Iron Wks., Boone, Ia.
Raber & Lang Mfg. Co., Kendallville, Ind.

SHORES

Dayton Sure Grip & Shore Co., Dayton, O.
M. & M. Form Clamp Co., Minneapolis
The O. D. G. Co., Owensboro, Ky.
H. W. Ross Co., Cincinnati, O.
Ross-Meyer-Hecht Co., Cincinnati, O.
Symons Clamp & Mfg. Co., Chicago.
Universal Form Clamp Co., Chicago.

SHOVELS, CRAWLING TRACTOR

*Erie Steam Shovel Co., Erie, Pa.
*Speeder Mch. Corp., Cedar Rapids, Ia.
*Thew Shovel Co., Lorain, Ohio
Amer. Hst. & Derrick Co., St. Paul.

SHOVELS, ELECTRIC

*Bay City Dredge Wks., Bay City, Mich.
*Byers Mach. Co., Ravenna, O.
*Koehring Co., Milwaukee, Wis.
*Link-Belt Co., Chicago.
*Speeder Machy Corp., Cedar Rapids, Ia.
*Thew Shovel Co., Lorain, O.
Amer. Hst. & Derrick Co., St. Paul.
Bucyrus Co., So. Milwaukee, Wis.
Industrial Wks., Bay City, Mich.
Marion Steam Shovel Co., Marion, O.
Osgood Co., Marion, O.

SHOVELS, GASOLINE

*Bay City Dredge Wks., Bay City, Mich.
*Byers Mach. Co., Ravenna, O.
*Erie Steam Shovel Co., Erie, Pa.
*General Excavator Co., Marion, O.
*Insley Mfg. Co., Indianapolis.
*Koehring Co., Milwaukee, Wis.
*Link-Belt Co., Chicago.
*Mead-Morrison Mfg. Co., Boston
*Orton Crane & Shovel Co., Chicago.
*Speeder Machy Corp., Cedar Rapids, Ia.
*Star Drilling Machine Co., Akron, O.
*Thew Shovel Co., Lorain, O.
Amer. Hst. & Derrick Co., St. Paul.
Amer. Steel Dredge Co., Ft. Wayne, Ind.
Austin Mach. Corp., Muskegon, Mich.
Brown Htg. Machy Co., Cleveland, O.
Bucyrus Co., So. Milwaukee, Wis.
Harnischfeger Corp., Milwaukee, Wis.
Industrial Wks., Bay City, Mich.
Marion Steam Shovel Co., Marion, O.
McMyler Interstate Co., Cleveland, O.
Osgood Co., Marion, O.
Universal Power Shovel Co., Detroit.

If you find any errors or omissions in this Where to Purchase list, please send corrections to
CONTRACTORS AND ENGINEERS MONTHLY



Easily changed over to shovel, crane, clamshell or dragline without changes or additions in operating machinery. Above is a General with crane and clamshell equipment for laying pipe and filling in trench.

GAS or Electric. Digs a trench 16 feet deep, bucket widths 24 inches, 30 inches, 36 inches. Full circle swing—dumps behind as well as at sides. Special design gives enormous bail-pull direct without sheave block. Fast operation. Economical because no power waste in the simplified machinery. Travels away from the work—on solid ground—does not straddle the trench. Built up of steel castings. One-man operation. Distributors and stock machines in principal cities.

General



THE GENERAL EXCAVATOR COMPANY—MARION, OHIO, U. S. A.

Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.

Where to Purchase

SHOVELS, GASOLINE (FORDSON)

- *Inley Mfg. Co., Indianapolis, Ind.
- *Universal Power Shovel Co., Detroit.
- Anthony Co., Streator, Ill.
- Hughes-Keenan Co., Cleveland.
- Mandt Company, Keokuk, Ia.
- Milwaukee Elec. Crane & Mfg. Co., Milwaukee.
- Squier-Rix Co., Milwaukee.

SHOVELS, STEAM

- *Erie Steam Shovel Co., Erie, Pa.
- *Keystone Driller Co., Beaver Falls, Pa.
- *Orton Crane & Shovel Co., Chicago.
- *Thew Shovel Co., Lorain, O.
- Amer. Hat. & Derrick Co., St. Paul.
- Bellwood Stm. Shovel Co., Bellwood, Pa.
- Bucyrus Co., So. Milwaukee, Wis.
- Industrial Wks., Bay City, Mich.
- Marion Steam Shovel Co., Marion, O.
- Osgood Co., Marion, O.
- Russell & Co., Massillon, O.

SIDEWALK AND ROAD FORMS (See Forms, Concrete)

SHOVELS, SPADES & SCOOPS

- American Mfg. Co., Chattanooga, Tenn.
- Ames Shovel & Tool Co., Boston.
- Baldwin Tool Wks., Parkersburg, W. Va.
- Beall Bros. Co., Alton, Ill.
- Connestant Shovel Co., Connestant, O.
- Hubbard & Co., Pittsburgh, Pa.
- Indiana Shovel Co., New Castle, Ind.
- Jackson Shovel Co., Montpelier, Ind.
- Pittsburgh Shovel Co., Pittsburgh, Pa.
- Russell Shovel Co., Alliquippa, Pa.
- Stevens-Webb Co., Inc., Altoona, Pa.
- Union Furnace Mfg. Co., Altoona, Pa.
- Wood Shovel & Tool Co., Piqua, O.
- Wyoming Shovel Wks., Wyoming, Pa.

SIGNS, STREET AND ROAD

- Almoyd Sign & Signal Co., Chicago.
- Auto Sign Display Co. of Mo., St. Louis, Mo.
- Baltimore Enam. & Nev. Co., Baltimore.
- Elkhart Fdry. & Mach. Co., Elkhart, Ind.
- Evern-Century Sign Co., Boston.
- Ingram-Richardson Mfg. Co., Beaver Falls, Pa.
- Lyle-Signs, Minneapolis, Minn.
- Municipal Street Sign Co., N. Y.
- Ohio Traffic Devices Co., Columbus.
- Rochester St. Signal Co., Rochester, N. Y.
- Standard Mfg. Co., Cedar Falls, Ia.
- Union Iron Prod. Co., E. Chicago, Ind.
- Western Stamping & Mfg. Co., St. Paul

SLEEVES, TAPPING AND VALVE

- Mueller Company, Decatur, Ill.
- Rensselaer Valve Co., Troy, N. Y.
- A. P. Smith Mfg. Co., East Orange, N. J.

SLUICE GATES (See Gates, Sluice)

SMOKE STACKS (See Stacks, Steel)

SNOW CLEANING MACHINERY

- *Austin-Western Rd. Mch. Co., Chicago.
- *Baker Mfg. Co., Springfield, Ill.
- *Barber-Greene Co., Aurora, Ill.
- *Byers Mach. Co., Bayona, O.
- *Caterpillar Tractor Co., San Leandro, Calif. and Peoria, Ill.
- *Cleveland Tractor Co., Cleveland, O.
- *Good Rds. Mach. Co., Kennett Sq., Pa.
- *La Plant-Cheate Mfg. Co., Cedar Rapids, Ia.
- *Mack Trucks, Inc., N. Y.
- *Mead-Morrison Mfg. Co., E. Boston.
- *Monarch Tractors Corp., Springfield, Ill.
- *Russell Grader Mfg. Co., Minneapolis.
- Austin Mfg. Co., Chicago.
- O. D. Edwards Mfg. Co., Albert Lea, Minn.
- Hiway Service Corp., Wausau, Wis.
- Killefer Mfg. Co., Los Angeles, Cal.
- Klauser Mfg. Co., Dubuque, Iowa.
- Linn Mfg. Co., Morris, N. Y.

SNOW FENCING

- *Good Roads Machy. Co., Kennett Square, Pa.
- Cyclone Fence Co., Waukegan, Ill.
- Wickwire-Spencer Steel Co., N. Y.
- *SPADES (See Shovels)
- *SPRAYERS, ASPHALT AND TAR
- *Littleford Bros., Cincinnati.
- Kinney Mfg. Co., Boston.

SPRAYING MACHINERY FOR TREES

- Bean Spray Pump Co., Lansing, Mich.
- Field Force Pump Co., Elmira, N. Y.
- Fitzhenry-Gupitill Co., E. Cambridge, Mass.

SPRAY PAINTING MACHINERY (See Painting Machinery)

SPREADERS, STONE

- *Austin-Western Rd. Mch. Co., Chicago.
- *Gallon Ir. Wks. & Mfg. Co., Gallon, O.
- Burch Corp'n., Crestline, O.
- Shaw-Enoch Tractor Co., Minneapolis.
- Universal Road Machy. Co., Kingston, N. Y.

STACKS, STEEL

- *Blaw-Knox Co., Pittsburgh, Pa.
- *Connery & Co., Inc., Philadelphia.
- *Heil Co., Milwaukee, Wis.
- *Holtzel St. Form & Ir. Co., Warren, O.
- *Jos. Henhorst Co., Cincinnati, O.
- *Littleford Bros., Cincinnati, O.
- Birmingham Tank Co., Birmingham, Ala.
- Canton Art Metal Co., Canton, O.
- Chatta. Boiler & Tank Co., Chatta, Tenn.
- Chicago Bridge & Iron Wks., Chicago.
- Graver Corp., Chicago.
- Owensboro Ditcher & Grader Co., Owensboro, Ky.
- Rotary Snow Plow Co., Minneapolis.
- Shaw-Enoch Tractor Co., Minneapolis.
- W. M. Toy Co., Sidney, O.
- Union-Iron Wks., Inc., Bangor, Me.
- Walsh Holyoke St. Blr. Wks., Holyoke, Mass.
- Walter Snow Fighters, L. I. City, N. Y.
- N. Y. Central Iron Wks. Co., Inc., Hagerstown, Md.
- Tippett & Wood, Phillipsburg, Pa.
- Petroleum Iron Wks. Co., Sharon, Pa.
- Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
- W. B. Seale & Sons, Pittsburgh, Pa.
- Walsh & Weidner Boiler Co., Chattanooga, Tenn.

STANDPIPES & ELEVATED TANKS

- W. E. Caldwell Co., Louisville, Ky.
- Chatta. Blr. & Tank Co., Chatta, Tenn.
- Chicago Bridge & Iron Wks., Chicago.
- R. D. Cole Mfg. Co., Newnan, Ga.
- Lancaster Iron Wks., Lancaster, Pa.
- Pacific Tank & Pipe Co., San Francisco.
- Petroleum Ir. Wks. Co., Sharon, Pa.
- Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
- Tippett & Wood, Phillipsburg, Pa.
- United Iron Wks., Inc., K. City, Mo.
- Walsh & Weidner Boiler Co., Chattanooga, Tenn.

STEAM SHOVELS (See Shovels, Steam)

STEAM TURBINES (See Turbines)

STEEL PLATE CONSTRUCTION

- *Blaw-Knox Co., Pittsburgh, Pa.
- *Connery & Co., Philadelphia.
- *Heil Co., Milwaukee, Wis.
- *Holtzel St. Form & Ir. Co., Warren, O.
- *Jos. Henhorst Co., Cincinnati, O.
- *Littleford Bros., Cincinnati, O.
- *Union Iron Wks., Inc., Hoboken, N. J.
- Bethlehem Steel Co., Bethlehem, Pa.
- Biggs Boiler Wks., Akron, O.
- Birmingham Tank Co., Birmingham, Ala.
- Chatta. Boiler & Tank Co., Chatta, Tenn.
- Chicago Bridge & Iron Wks., Chicago.
- Graver Corp., E. Chicago, Ind.
- Hendrick Mfg. Co., Carbondale, Pa.
- McClintic-Marshall Co., Pittsburgh, Pa.

- N. Y. Central Iron Wks. Co., Inc., Hagerstown, Md.
- Penna. Bridge Co., Beaver Falls, Ia.
- Petroleum Iron Wks. Co., Sharon, Pa.
- Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
- Riter-Conley Co., Pittsburgh, Pa.
- W. B. Seale & Sons, Pittsburgh, Pa.
- Walsh & Weidner Blr. Co., Chatta, Tenn.

STEEL SHEET PILING

- *Wemlinger, Inc., N. Y.

STEEL TOWERS, CONCRETE

- *Inaley Mfg. Co., Indianapolis, Ind.
- *Ransome Conc. Mch. Co., Dunellen, N. J.

STOKERS, MECHANICAL

- Automatic Furnace Co., Dayton, O.
- Babcock & Wilcox Co., N. Y.
- Combustion Engineering Corp., N. Y.
- Detroit Stoker Co., Detroit.
- Green Eng. Co., E. Chicago, Ind.
- Sanford Riley Stoker Co., Worcester, Mass.
- Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

STREET AND ROAD SIGNS (See Signs)

STREET BROOMS

- Ind. Brush & Broom Mfg. Co., Indianapolis, Ind.
- Kendallville Broom & Brush Co., Kendallville, Ind.
- Lang Broom Co., Pittsburgh, Pa.
- Jos. Lay Co., Portland, Ind.
- Osborn Mfg. Co., Cleveland, O.
- Standard Brh. & Brm. Mfg. Co., Ch'go.

STREET CLEANERS' CARTS

- Durlach Can & Iron Wks., B'klyn, N. Y.
- Rochester Can Co., Rochester, N. Y.
- Tarrant Mfg. Co., Saratoga Springs, N. Y.

STREET FLUSHERS AND SPRINKLERS

- *Austin-Western Rd. Mch. Co., Chicago.
- *Gallon Ir. Wks. & Mfg. Co., Gallon, O.
- *Heil Co., Milwaukee, Wis.
- *Kinney Mfg. Co., Boston.
- *Mack Trucks, Inc., N. Y.
- *Whitehead & Kales Co., Detroit.
- Austin Mfg. Co., Chicago.
- Autocar Co., Ardmore, Pa.
- E. D. Etnyre & Co., Oregon, Ill.
- Federal Motor Truck Co., Detroit.
- General Motors Truck Co., Chicago.
- Chas. Hvas & Co., N. Y.
- Municipal Supply Co., So. Bend, Ind.
- White Co., Cleveland, O.

STREET LAMP POSTS

- *Novo Engine Co., Lansing, Mich.
- Amor. Conc. Prod. Co., Forest Park, Ill.
- Chicago Conc. Post Co., Chicago.
- J. B. Clow & Sons, Chicago.
- Electric Ry. Equip. Co., Cincinnati, O.
- King Mfg. Co., Chicago.
- Logan Co., Louisville, Ky.
- J. L. Mott Iron Wks., New York.
- J. S. Schofield's Sons Co., Macon, Ga.
- Union Metal Mfg. Co., Canton, O.
- Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

STREET SIGNS (See Signs, Street)

STREET SWEEPERS

- *Austin-Western Rd. Mch. Co., Chicago.
- *Kinney Mfg. Co., Boston.
- *Whitehead & Kales Co., Detroit.
- Austin Mfg. Co., Chicago.
- Butler Mfg. Co., Cleveland, O.
- Elgin Sales Corp., N. Y.

STREET SWEEPER BROOMS

- Kendallville Broom & Brush Co., Kendallville, Ind.
- Lang Broom Co., Pittsburgh, Pa.
- Jos. Lay Co., Portland, Ind.
- Osborn Mfg. Co., Cleveland, O.
- Standard Brh. & Brm. Mfg. Co., Ch'go.

* Indicates that the manufacturer carries an advertisement. See index facing inside back cover.*



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The American Institute of Steel Construction has developed a Standard Specification which is estimated to be saving building owners and other taxpayers more than \$30,000,000 a year! The Specification covers the design, fabrication and erection of structural steel for buildings. It was developed with the cooperation of the ablest engineering talent in America. It is endorsed by such bodies as the A. S. C. E., the New

York Building Congress, and the Pacific Coast Building Officials Conference.

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Where to Purchase

STUMP PULLERS

- *La Plant-Cheate Mfg. Co., Cedar Rapids, Ia.
- Ersted Machy. Mfg. Co., Portland, Ore.
- H. L. Bennett & Co., Westerville, O.
- John Waldron Corp., New Brunswick, N. J.

SUBGRADING MACHINES

- *Koehring Co., Milwaukee.
- *Lakewood Eng. Co., Cleveland, O.
- The Hug Co., Highland, Ill.
- Shaw-Enoch Tractor Co., Minneapolis.

SUPERHEATERS

- Babcock & Wilcox Co., N. Y.
- Power Specialty Co., N. Y.
- Superheater Co., N. Y.

SURVEYORS' INSTRUMENTS (See Instruments)

SWITCHBOARDS

- Allis-Chalmers Mfg. Co., Milwaukee.
- General Elec. Co., Schenectady, N. Y.
- Wagner Elec. Mfg. Co., St. Louis, Mo.
- Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

TAMPING MACHINES

- *Cement Block Machy. Co., Newark, N.J.
- Abrams Cement Tool Co., Detroit.
- Chicago Pneum. Tool Co., N. Y.
- Harnischfeger Corp., Milwaukee, Wis.
- Independent Pn. Tool Co., Chicago.
- Ingersoll-Rand Co., N. Y.

TANKS, AIR COMPRESSOR

- *Connery & Co., Inc., Philadelphia.
- *Hull Co., Milwaukee, Wis.
- *Littleford Bros., Cincinnati, O.
- Biggs Boiler Wks., Akron, O.
- Birmingham Tank Co., Birmingham, Ala.
- Chicago Bridge & Iron Wks., Chicago
- Chicago Pneum. Tool Co., N. Y.
- Curtis Pn. Machy. Co., St. Louis, Mo.
- Graver Corp., E. Chicago, Ind.
- Indiana Air Pump Co., Indianapolis.
- Ingersoll-Rand Co., N. Y.
- Lancaster Iron Wks., Lancaster, Pa.
- Nagle Eng. & Boiler Wks., Erie, Pa.
- National Tube Co., Pittsburgh, Pa.
- Petroleum Iron Wks. Co., Sharon, Pa.
- Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
- W. B. Seale & Sons, Pittsburgh, Pa.
- Westinghouse Tract. Brake Co., Wilmerding, Pa.
- Worthington Pump & Machy. Corp., N.Y.

TANKS, STEEL

- *Connery & Co., Philadelphia.
- *Hull Co., Milwaukee, Wis.
- *Jos. Honhorst Co., Cincinnati, O.
- *Littleford Bros., Cincinnati, O.
- Bausman Mfg. Co., Millersville, Pa.
- Biggs Boiler Wks., Akron, O.
- Birmingham Tank Co., Birmingham, Ala.
- S. F. Bowser & Co., Inc., Ft. Wayne, Ind.
- J. I. Case Threshing Mach. Co., Racine, Wis.
- W. E. Caldwell Co., Louisville, Ky.
- Canton Art Metal Co., Canton, O.
- Chatta. Boiler & Tank Co., Chattanooga, Tenn.
- Chicago Bridge & Iron Wks., Chicago.
- Columbian St. Tank Co., K. City, Mo.
- Dover Boiler Wks., N. Y.
- Farrall Mfg. Co., Joliet, Ill.
- C. C. Potts Co., Middletown, O.
- Graver Corp., E. Chicago, Ind.
- R. Hardesty Mfg. Co., Denver, Col.
- Hendrick Mfg. Co., Carbondale, Pa.
- Lancaster Iron Wks., Lancaster, Pa.
- Nagle Eng. & Boiler Wks., Erie, Pa.
- N. Y. Central Iron Wks. Co., Hagerstown, Md.
- Pacific Tank & Pipe Co., San Francisco.
- Petroleum Iron Wks. Co., Sharon, Pa.
- Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.

- Ritter-Conley Co., Pittsburgh, Pa.
- W. B. Seale & Sons, Pittsburgh
- United Iron Wks., Inc., K. City, Mo.
- Walsh & Weidner Boiler Co., Chattanooga, Tenn.

TANKS, WOOD

- W. E. Caldwell Co., Louisville, Ky.
- G. M. Davis & Son, Palatka, Fla.
- Eagle Tank Co., Chicago.
- Hauser-Stander Tank Co., Cincinnati, O.
- Kalamazoo Tank & Silo Co., Kalamazoo, Mich.
- Nat'l. Tank & Pipe Co., Portland, Ore.
- Pacific Tank & Pipe Co., San Francisco.
- Redwood Mfrs. Co., San Francisco.
- A. T. Stearns Lumber Co., Boston.
- U. S. Wind Eng. & Pump Co., Batavia, Ill.
- Wendnagel & Co., Chicago.

TANK WAGONS

- *Allis Ed. Mach. Co., Frankfort, N. Y.
- *Gallen Ir. Wks. & Mfg. Co., Gallen, O.
- *Hull Co., Milwaukee, Wis.
- *Jos. Honhorst Co., Cincinnati, O.
- *Mack Trucks, Inc., N. Y.
- Butler Mfg. Co., Minneapolis, Minn.
- J. I. Case Threshing Mach. Co., Racine.

TAPES, STEEL AND METALLIC

- *Lufkin Rule Co., Saginaw, Mich.
- Eugene Dietzgen Co., N. Y.
- Keuffel & Esser Co., Hoboken, N. J.
- The L. S. Starrett Co., Athol, Mass.

TAR

- *Barrett Co., N. Y.
- Amer. Tar Prod. Co., Pittsburgh, Pa.

TARPAULINS WATERPROOF

- Hoosier Tarpaulin & Canvas Goods Co., Indianapolis, Ind.

TAR KETTLES (See Kettles)

THAWING OUTFITS

- *Aerol Burner Co., West New York, N.J.
- *Littleford Bros., Cincinnati.
- Hauck Mfg. Co., Bklyn., N. Y.

TIE TAMPERS

- Electric Tamper & Equip. Co., Chicago.

TIE BOLTS FOR WALL FORMS

- Howley Tie Bolt Co., Minneapolis
- M. & M. Wire Clamp Co., Minneapolis.

TIES, STEEL

- Carnegie Steel Co., Pittsburgh, Pa.
- Int'l. Steel Tr. Co., Cleveland, O.
- Koppel Ind. Car & Equip. Co., Koppel, Pa.
- Sweet's Steel Co., Williamsport, Pa.

TIMBER CLAMPS

- M. & M. Wire Clamp Co., Minneapolis.
- Pyle-Rogers Corp., N. Y.

TIRES, RUBBER (For Motor Trucks)

- Firestone Tire & Rubber Co., Akron, O.
- Fisk Tire Co., Chicopee Falls, Mass.
- Goodrich Rubber Co., Akron, O.
- Goodyear Tire & Rubber Co., Akron, O.
- Kelly Springfield Tire Co., N. Y.
- U. S. Tire Co., N. Y.

TOOL HOUSES, PORTABLE STEEL

- *Blaw-Knox Co., Pittsburgh, Pa.
- *Littleford Bros., Cincinnati, O.

TORCHES, OIL (HEATING)

- *Littleford Bros., Cincinnati.
- *Mead-Morrison Mfg. Co., E. Boston.
- *Alex. Milburn Co., Baltimore, Md.
- Chausse Oil Burner Co., Elkhart, Ind.
- Hauck Mfg. Co., Bklyn., N. Y.
- Hoosier Paint Wks., Ft. Wayne, Ind.
- Sewall Paint & Varnish Co., K. City, Mo.
- Sherwin-Williams Co., Cleveland, O.
- Tropical Paint & Oil Co., Cleveland, O.
- Truscon Laboratories, Detroit, Mich.

TOWERS (See Standpipe, Tanks and Towers)

TRACKS, INDUSTRIAL AND PORTABLE

- *Easton Car & Constrn. Co., Easton, Pa.
- *Lakewood Eng. Co., Cleveland, O.
- Atlas Car & Mfg. Co., Cleveland, O.
- Bethlehem Steel Co., Bethlehem, Pa.
- Chase Fdry. & Mfg. Co., Columbus, O.
- C. W. Hunt Co., Inc., W.N. Brighton, N.Y.
- Koppel Ind. Car & Equip. Co., Koppel, Pa.
- Sweet's Steel Co., Williamsport, Pa.

TRACTION TREADS (See Treads, Traction)

TRACTORS

- *Caterpillar Tractor Co., San Leandro, Calif.
- *Cleveland Tractor Co., Cleveland, O.
- *Geo. Hais Mfg. Co., New York.
- *Huber Mfg. Co., Marion, O.
- *J. T. Tractor Co., Cleveland, O.
- *John Lawson Co., New Holstein, Wis.
- *Mack Trucks, Inc., N. Y.
- *Mead-Morrison Mfg. Co., E. Boston.
- *Monarch Tractors Corp., Springfield, Ill.
- Advance-Rumely Thresher Co., Laporte, Ind.
- Allis-Chalmers Mfg. Co., Milwaukee.
- Bates Mfg. Co., Joliet, Ill.
- J. I. Case Threshing Co., Racine, Wis.
- Clark Tractor Co., Battle Creek, Mich.
- Electric Wheel Co., Quincy, Ill.
- Emerson-Brantingham, Rockford, Ill.
- Ford Motor Co., Detroit, Mich.
- Hart-Parr Co., Charles City, Ia.
- Int'l. Harvester Co., Chicago
- Kinnard & Haines, Minneapolis, Minn.
- Lombard Tractor & Truck Corp., N. Y.
- Minneapolis Steel & Mach. Co., Minneapolis.
- Rogers Bros. Corp., Albion, Pa.
- Shaw-Enoch Tractor Co., Minneapolis, Wis.
- Wehr Co., Milwaukee.

TRACTOR ACCESSORIES

- *Trail-It Co., St. Paul, Minn.
- *Whitehead & Kales Co., Detroit.
- Pickering Governor Co., Portland, Conn.

TRACTOR HITCHES

- *Trail-It Co., St. Paul, Minn.
- Whitehead & Kales Co., Detroit.

TRAFFIC LINE MARKERS

- Carrara Paint Co., Cleveland.
- Continental Prod. Co., Euclid, O.
- Line-O-Graph Co., N. Y.
- Tenn. Tool Wks. Inc., Knoxville, Tenn.

TRAFFIC PAINT

- J. E. Bauer Co., Los Angeles, Cal.
- Continental Prod. Co., Euclid, O.
- Hanline Bros., Baltimore, Md.

TRAFFIC PLATES

- Allan Wood & St. Co., Phila.
- Amer. Press & Sign Co., Phila.
- Central Ir. & St. Co., Harrisburg, Pa.

TRAFFIC SIGNAL EQUIPMENT

- Acme Traffic Signal Co., Los Angeles.
- Alumond Sign & Signal Co., Chicago.
- Amer. Gas Accumulator Co., Elizabeth, N. J.
- Auto Sign Display Co. of Mo., St. Louis, Mo.
- Automatic Signal & Sign Co., Canton, O.
- Cretney Traffic Guide Co., Madison, Wis.
- Crouse-Hinds Co., Syracuse, N. Y.
- Elkhart Fdry. & Mach. Co., Elkhart, Ind.
- Esaco Mfg. Co., Peoria, Ill.
- Evernu-Century Sign Co., Boston.
- Griswold Safety Signal Co., Minneapolis
- Harrington-Seaberg Corp., Moline, Ill.
- Horn Signal Mfg. Corp., Newark, N.J.
- Line Material Co., So. Milwaukee, Wis.
- Little Gaint Co., Mankato, Minn.
- Lyle-Signs, Minneapolis, Minn.

If you find any errors or omissions in this Where to Purchase list, please send corrections to
CONTRACTORS AND ENGINEERS MONTHLY

On September 1, 1927
THE AKRON BARROW COMPANY
Becomes
GENERAL WHEELBARROW
COMPANY



EFFECTIVE September 1, 1927, the name of "The Akron Barrow Company" will be changed to "General Wheelbarrow Company." We feel that our distributors will be interested in a statement of the reasons for the change and of the advantages which will result.

Retrospect

The Akron Barrow Company has always been independently owned and managed. It has never had any connection with any other manufacturer or any distributor.

The history of the Company dates back to 1840. Its first wheelbarrows, which were of the heavy duty type, earned a reputation for stability with foundries for similar exacting purposes. All of these "Akron" barrows, together with "Akron" agricultural implements, were made in the Company's Akron plant.

In 1921 the manufacture of all these items was transferred to Cleveland, but the name "Akron" was retained. The Akron line speedily broadened into a larger group of general purpose barrows, garden barrows for home use, and allied products. Concrete carts, salamanders, steel mortar boxes, scrapers, and industrial trucks have been added.

The financial condition of the Company may be indicated by the current phrase that it "does not owe a dollar." It has always discounted its bills. Its financial strength, reflected by its mercantile ratings, has increased steadily as the scope of its activity widened. This natural, healthy progress has been enjoyed during the past 32 years without any change whatsoever in financing or any form of reorganization.

Present—Future

The business of the Company is growing constantly in number of distributors as well as in value and number of units produced. During 1927 not less than 40 new major distributors have been added. Despite the slowing up of building operations and other adverse business conditions, far more units have been shipped in 1927 than in 1926 or any previous year.

General Wheelbarrow Company remains under the management of those who have been responsible for its consistent progress. No refinancing nor reorganization has taken place, nor is any contemplated.

General Wheelbarrow Company will announce a series of important developments in 1927 and 1928. Each will



combine new features of design with value so remarkable as to give the General-Akron distributor an outstanding advantage.

Facilities

Probably no other wheelbarrow manufacturer in America is in position to equal the service now obtainable from General Wheelbarrow Company.

The equipment of the Company's present plant is second to none. Abundant manufacturing and storage space permit of maintaining ample stocks. Such facilities, together with complete stock and inventory records, enable General-Akron to fill orders promptly at peak seasons and always. The Company has ample reserve facilities to take care of the new distributors who are joining us, as well as plenty of ground for physical expansion.

General Wheelbarrow Company is more fortunately located than any other wheelbarrow manufacturer, and General-Akron distributors profit accordingly. Cleveland's central location commands low freight rates in all directions and quick deliveries to the greatest number of distributing points.

Seven trunk lines, besides electric and trucking systems, provide connections from coast to coast. Cleveland is also ideally situated for lake shipments, as well as for shipments via rail and water to the Pacific seaboard. General-Akron

distributors have already learned that they can rely upon immediate deliveries from the factory.

General-Akron jobbers effect marked savings for their dealers. Mixed carlots made up from the Company's wide range of products command carload freight rates which are less than half the LCL rates.

Policies

Full protection is assured to General-Akron jobbers. Their number is carefully restricted in every territory. All inquiries are referred to the proper distributor. Each distributor enjoys those benefits in respect to volume and profit which will make him seek and cherish the General franchise.

Every General-Akron product is guaranteed by the factory to give such satisfaction as will make the buyer a repeat customer. General-Akron distributors are instructed to do business on that basis.

General-Akron has been foremost in steadily improving the quality, finish and salability of all its lines. Interchangeability of parts is another cardinal doctrine. General-Akron's use of 8-spoke wheels, $\frac{5}{8}$ " axles, and first class paint and finish, even on its low priced models, is typical of the positive stand General-Akron has always taken on the side of quality and workmanship.

You should have a copy of Folder No. 205. It contains a brief statement of reasons for the change in name, as well as of the advantages which will accrue to General-Akron distributors.

GENERAL WHEELBARROW COMPANY

formerly

THE AKRON BARROW COMPANY

3140 East 65th Street

CLEVELAND, OHIO, U. S. A.



A Typical Heltzel Curb and Gutter Job

HELTZEL Curb and Gutter Forms have unmatched popularity with municipalities, engineers and contractors.

They align better, set and strip in less time and assure a decidedly better job of concrete work.

Due to the construction, spreading of

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All division plates can be removed without disturbing side rails.

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THE HELTZEL STEEL FORM & IRON CO., WARREN, OHIO

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Ohio Traffic Devices Co., Columbus, O.
 Rochester St. Signal Co., Rochester, N.Y.
 Tokheim Oil Tank & Pump Co., Ft. Wayne, Ind.
 Union Iron Prod. Co., E. Chicago, Ind.
 Universal Traffic Control Co., Oklahoma City, Okla.
 Weisbach Traffic Signal Co., Phila.

TRAILERS FOR TRUCKS AND TRACTORS

*Eagle Wagon Wks., Auburn, N. Y.
 *Easton Car & Const'n Co., Easton, Pa.
 *Highway Trailer Co., Edgerton, Wis.
 *La Plant-Choate Mfg. Co., Cedar Rapids, Ia.
 *Miami Trailer-Scraper Co., Troy, O.
 *Gustav Schaefer Wagon Co., Cleveland.
 *Whitehead & Kales Co., Detroit, Mich.
 Arcadia Trailer Corp., Newark, N. Y.
 Detroit Trailer & Mach. Co., Detroit.
 Electric Wheel Co., Quincy, Ill.
 Fruehauf-Trailer Co., Detroit, Mich.
 Hercules Trailer Mfg. Co., Los Angeles.
 Lee Trailer & Body Co., Chicago.
 Little Red Wagon Mfg. Co., Omaha.
 Rex-Watson Corp., Canastota, N. Y.
 Rogers Bros. Corp., Albion, Pa.
 Trail-Ford Co., Ann Arbor, Mich.
 Trailmobile Co., Cincinnati.
 Troy Trailer & Wagon Co., Troy, O.
 Warner Mfg. Co., Beloit, Wis.

TRAILERS, HEAVY MACHINERY

*Highway Trailer Co., Edgerton, Wis.

*Rogers Bros. Corp., Albion, Pa.

TRAILERS, INDUSTRIAL

*Easton Car & Const'n Co., Easton, Pa.
 *Highway Trailer Co., Edgerton, Wis.
 *Lakewood Eng. Co., Cleveland, O.
 *La Plant-Choate Mfg. Co., Cedar Rapids, Ia.
 *Miami Trailer-Scraper Co., Troy, O.
 *Rogers Bros. Corp., Albion, Pa.
 *Gustav Schaefer Wagon Co., Cleveland.
 *Whitehead & Kales Co., Detroit, Mich.
 Chase Fdry. & Mfg. Co., Columbus, O.
 Clark Tractor Co., Battle Creek, Mich.
 Detroit Trailer & Mach. Co., Detroit.
 Electric Wheel Co., Quincy, Ill.
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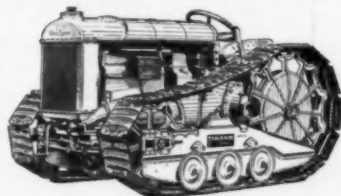
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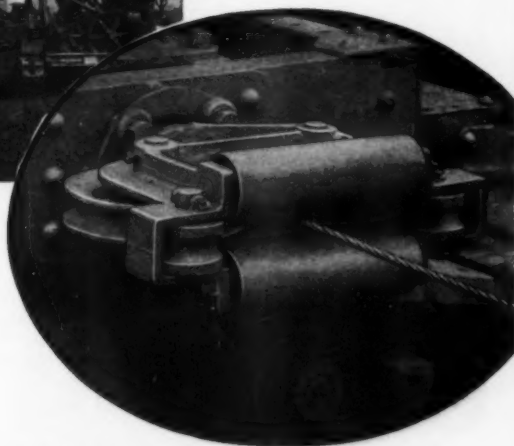
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AT RIGHT.—Close-up of the Parsons Fairlead, a patented advantage of the **Parsons 32** which gives higher filling speed with lower cable wear.

HANDLES MORE DIRT ---AND AT LOWER COST

HUNDREDS of contractors have found from experience that the **Parsons 32** is the most profitable means of filling trench. Compared with similar machines, it works faster, and consequently at less expense.

An important factor in the performance of the "32" is the Parsons Fairlead. Mounted on a full-revolving

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Being protected by patents, the Fairlead is one of many advantages that enable the **Parsons 32** to handle more dirt at lower cost.

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Swivel castor wheel,
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cation, assures free action
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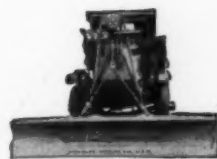
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With a fleet of Good Roads Plows you can clean up every section of the town at once—and do a better, quicker and cheaper job. Think how this will stretch your snow removal appropriation!

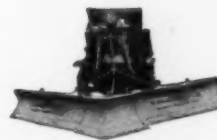
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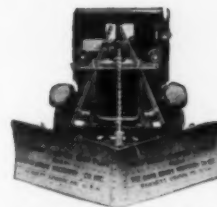
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SUPPOSE roads were ready made—suppose you could buy them like ribbon at so much a yard! ∞ Then the price tag would surely reveal that "Caterpillar" built roads are the cheapest.

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And "Caterpillar" Tractors keep your cost down! ~ They pull the biggest, stoutest equipment the market affords... they keep pulling it as the road lengthens and costs dwindle.

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There is a "Caterpillar" Dealer near you.

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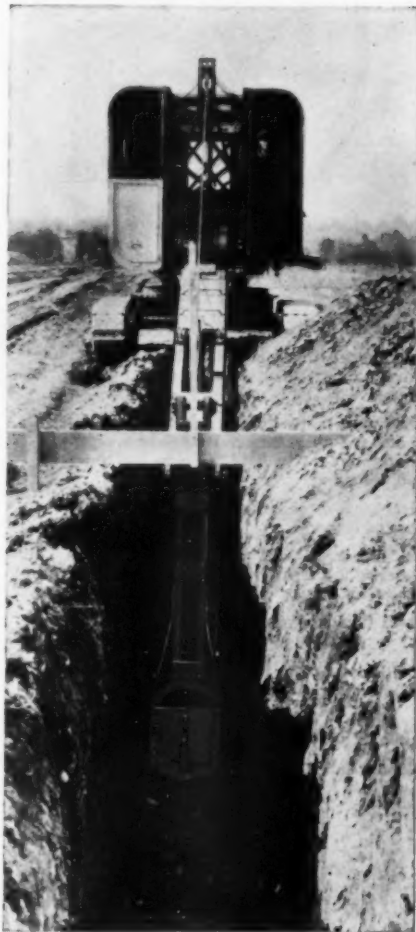
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***As a
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Fast! *Fast* in every function!

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Fast because of clutch-controlled power operated dipper-trip!

Fast because of high speed racking-in which retrieves the dipper quickly, placing it into position for its next load!

Fast because of finger-tip ease of control, with no loss of "feel" of the work!

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— and Koehring Heavy Duty construction stands the pace of record-breakers!

Shovel Capacities

Line-of-plate struck measure.

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No. 301—19'-6" Boom, 5½ Yd. Dipper on 19' Dipper Sticks; ¾ Yd. Dipper on 16' Dipper Sticks; 1 Yd. Dipper on 13' Dipper Sticks.

Shock absorber on boom. Wisconsin four cylinder gasoline engine, 5¼" x 6½", 1,000 R. P. M.

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Here is a machine that needs no laborers to keep feed it—a machine that will work in wet, sticky or even frozen snow—a machine that will work season after season without heavy repair bills.

The big superiority of the Hais Snow Loader is in the digging power of its revolving feeding propellers and tooth-edged conveyor flights.

Backed by the power of its 41 H.P. motor and the pressure of its slow-speed crowding drive it has put 8 to 10 yard loads in 1½ minutes. Mounted on long creeper treads that will not slip. The machine *digs*.

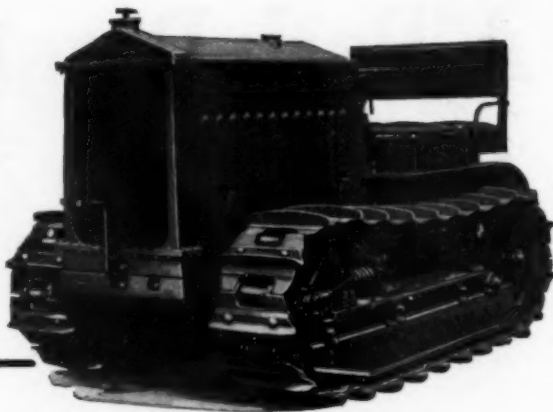
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Get the Full Meaning of CLETRAC'S Ten Greater Features!



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THE TRACTOR FLOW
"ITS A TEARER FOR ITS SIZE"

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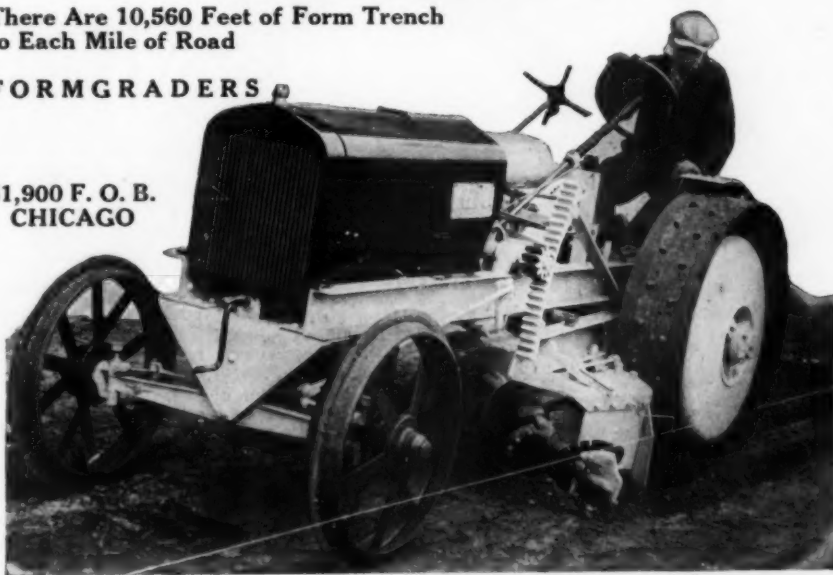
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For Cutting High Spots Off the Hardest Subgrades

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Revolving Cutter Does the Work of Many Picks and Shovels.
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ENGINE S

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No. 3

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THEW

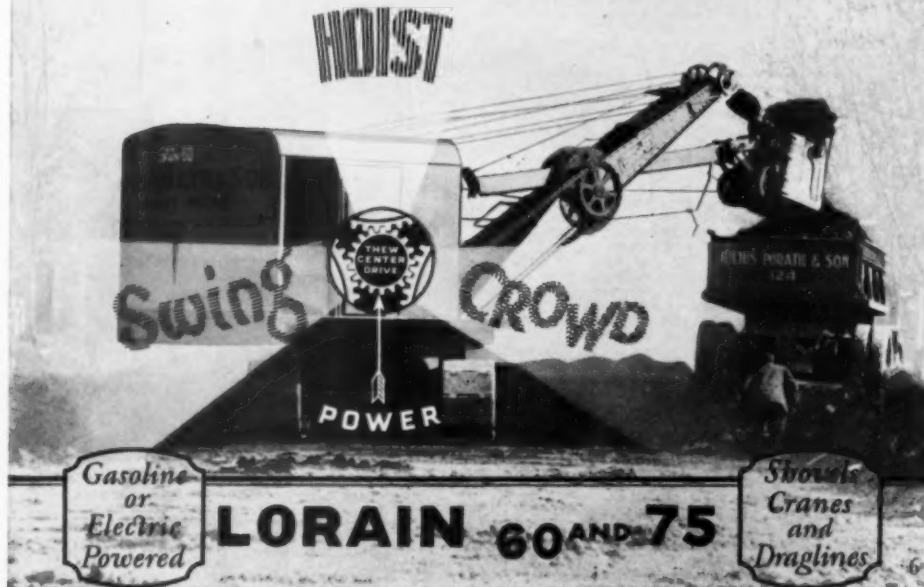
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Vol. XV
No. 3

Contractors *and* Engineers Monthly

September,
1927

Construction of the Elizabeth-Howland Hook Bridge, Staten Island, N. Y.

Foundation Work Completed and Steel Work Making Good Progress

AMONG the engineering and construction projects of moment in the New York-New Jersey District is the Elizabeth-Howland Hook bridge over the Arthur Kill. Pier work on this bridge, which is between Elizabeth, N. J., and Howland Hook, Staten Island, N. Y., has now been completed. The rapidity and smoothness with which it has been carried on is evidenced by the fact that bonds were sold little more than a year ago.

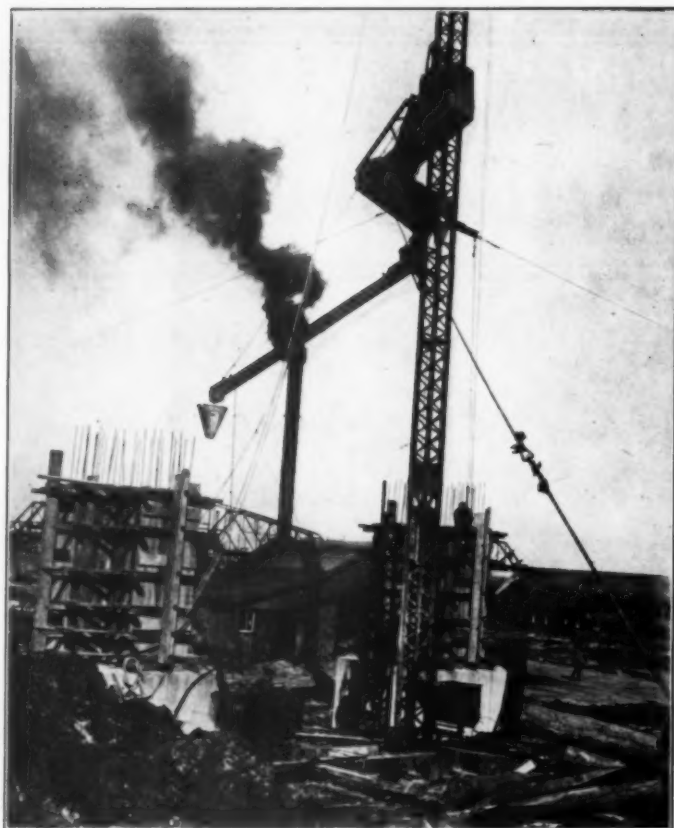
A large amount of the steel has already been delivered and plant and organization have ar-

rived and erection of the superstructure is proceeding. Plans are now under preparation by the Port of New York Authority, which is the two-state governmental agency building the bridge, for the construction of the plazas, abutments, roadways, sidewalks and electric lighting system.

Work is so far ahead of schedule that there seems no question but the contract dates for completion will be anticipated with a comfortable margin. In order that there might be no unavoidable delay in opening the bridge to the

KOEHRING
MIXER USED
TO POUR
FOUNDATIONS
AND PIERS
ON
STATEN ISLAND
APPROACH





POURING
FIRST LIFT
OF
SHAFT FORMS
ON PIER 2-E
HOWLAND HOOK
FEBRUARY 28, 1927
SHOWING INSLEY
MAST HOIST
AND CHUTE
AND
CLYDE GASOLINE
HOIST

public, construction was undertaken immediately upon the signing of the contracts and was carried on throughout the winter.

A great part of the tonnage of steel for the super-structure has been rolled at the mills and more than 50 per cent has been fabricated. Erection of the super-structure for the approaches has started and should be completed by Fall. With the continued pushing of the job throughout next Winter, all the steel work will be ready for roadway slabs, pavements, etc., early in the Spring of 1928. Contracts for the remainder will be awarded whenever it can be done to advantage and the bridge should be open to traffic in the Fall of 1928.

The bridge will have a four lane vehicular roadway. It is designed to carry the heaviest type of vehicular traffic, but no provision has been made for the accommodation of rapid transit service, as careful studies indicate the additional expense will not be justified. Pedestrians may hike from New Jersey to Staten

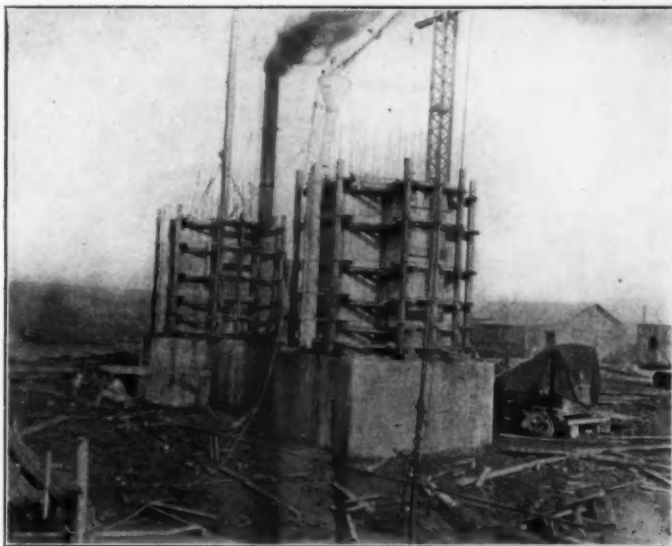
Island by way of a 5-foot sidewalk on each side of the bridge.

The bridge will cross the Arthur Kill with a main cantilever span of 672 feet in length and two anchor arms, each 240 feet, making the total length of the spans 1,152 feet, with the two piers resting on solid bed rock. There will be a clearance of 135 feet above M.H.W. Along with the necessary earth approaches which form the plazas at each end of the bridge, the Elizabeth approach will be about 3,300 feet long and the Howland Hook approach about 4,110 feet long. The entire length, therefore, will be about 8,562 feet.

The Elizabeth approach will consist of plate girder spans resting on piers carried from 24 to 48 feet below the ground surface. Deck spans will be used except at one point, where there is a railroad crossing, and where, through girders will be required. All steel below the deck on this crossing, will be covered with "Gunite" as a protection against locomotive gases and blasts.

The Staten Island approach will consist of

ANOTHER
VIEW SHOWING
THE SHAFT FORMS
IN GREATER
DETAIL



deck plate girders, resting on concrete piers carried on wood piles. The borings indicated that the rock was too deep to be reached economically and that the underlying material was too soft for spread footings.

Each of the approaches will be on a 4 per cent grade from the main bridge to the plaza. The Bethlehem Steel Co. has the contract for the super-structure.

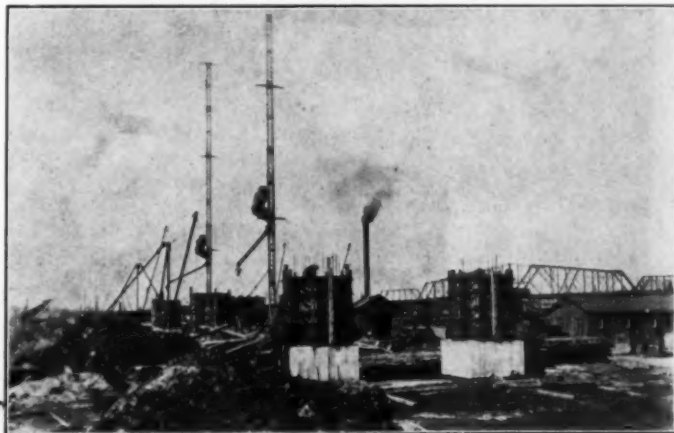
The cost of the bridge will be met by bonds, which will be amortized by tolls.

Crossing between New York and New Jersey at Elizabeth was a cherished dream until the Port of New York Authority came into existence and was organized as the only "going concern" that could handle the project successfully on the two-state basis and offer ready

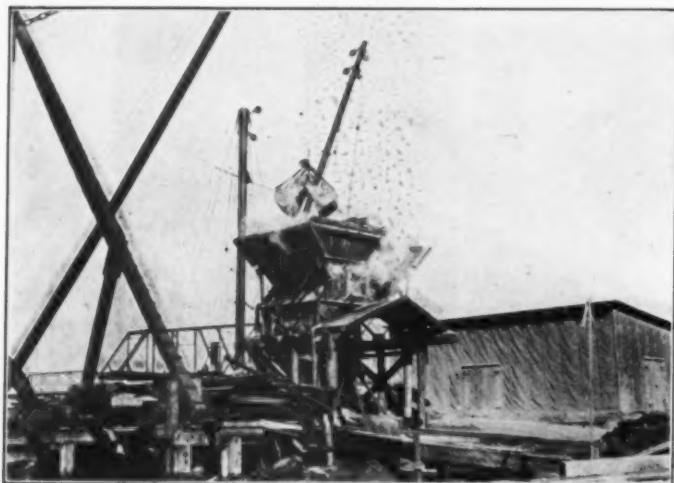
means for financing. Immediately following the sale of bonds a year ago, the Port Authority Bridge Engineer, O. H. Ammann placed in motion the necessary machinery for constructing this and other bridges which the Port Authority had been directed by the legislatures of the two States to erect. Edward W. Stearns is assistant to Mr. Ammann.

Dr. J. A. L. Waddell now of the firm of Waddell & Hardesty, prepared the contract plans and specifications, as the Port Authority did not have a Bridge Department at the time sufficiently well organized to handle the situation and it wished to avoid any delay.

York & Sawyer, architects, were retained to work out the architectural features of the plans. W. J. Boucher is Engineer of Construction.



VIEW
LOOKING WEST
ON HOWLAND HOOK
ON
FEBRUARY 28, 1927
SHOWING
POURING IN
PROGRESS.
PIER 3-E IN
FOREGROUND



**MATERIAL
HANDLING SHOWING
BATCHING
HOPPER
IN FOREGROUND
AND
CEMENT SHED IN
BACKGROUND
HOWLAND HOOK**

Further traffic studies were made under the direction of R. A. Leshner, Traffic Engineer. The Resident Engineer is Reuben T. Robinson. The cost of the bridge will be approximately \$6,500,000.00.

Members of the Board of the Port of New York Authority are: George S. Silzer, Chairman, Metuchen, N. J.; John F. Galvin, Vice-Chairman, New York City; Frank C. Ferguson, East Orange, N. J.; Schuyler N. Rice, New Brunswick, N. J.; Howard S. Cullman, New York City, and Herbert K. Twitchell, Brooklyn, N. Y. J. E. Ramsey is Chief Executive Officer and Julius Henry Cohen is Chief Counsel.

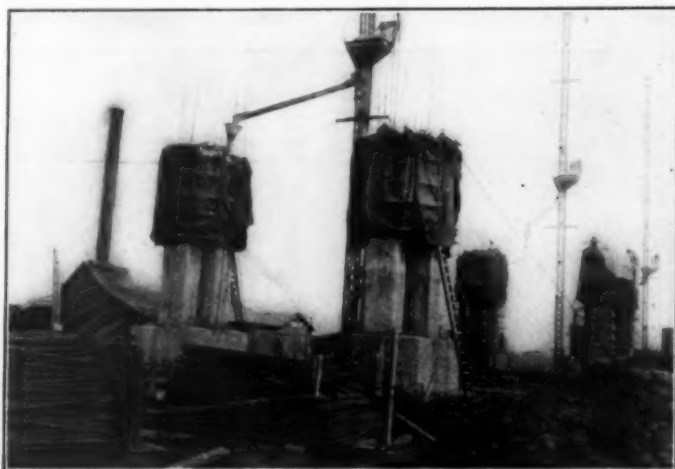
Construction and Plant Equipment Details

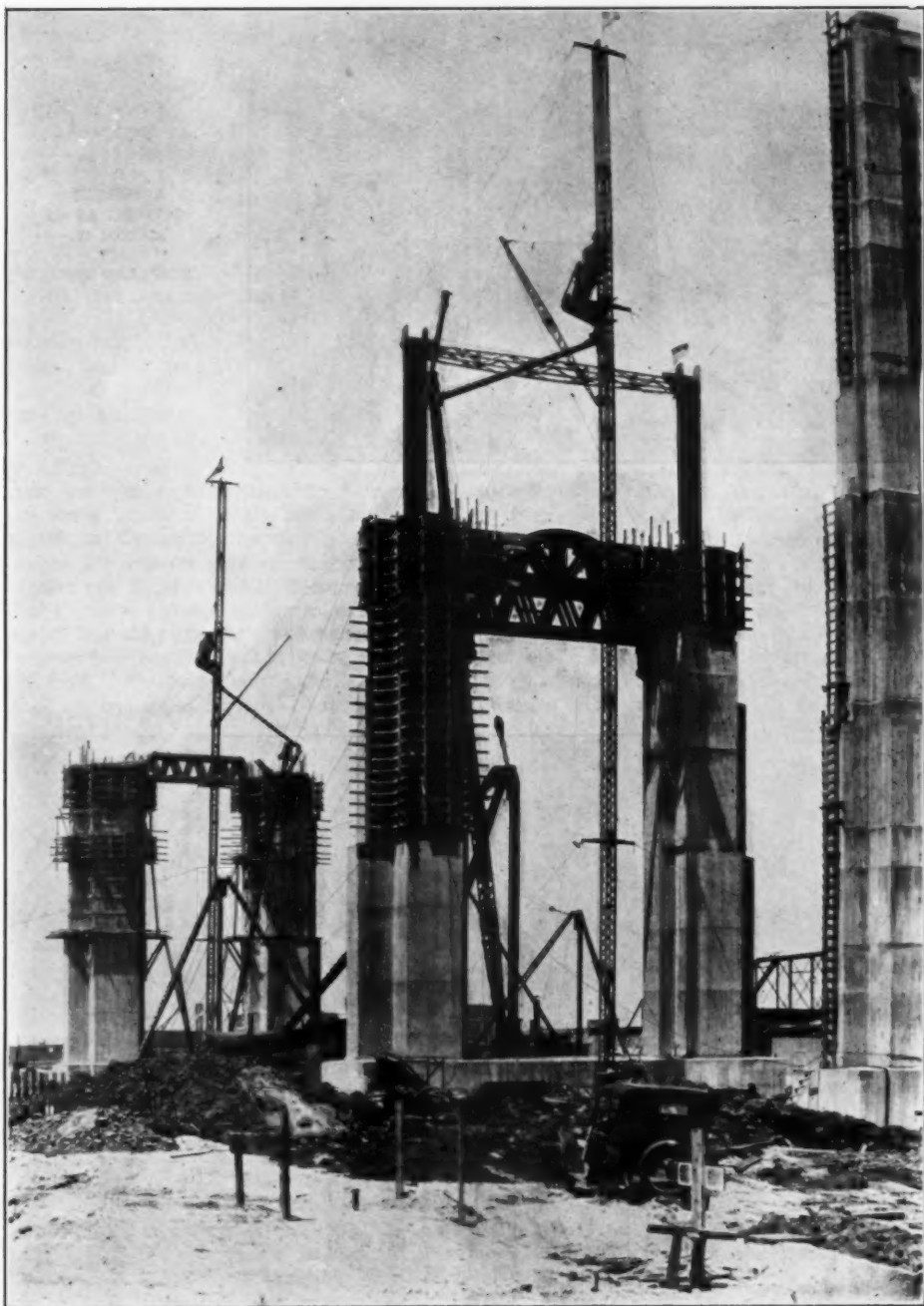
The substructure for the Elizabeth side of the Bridge was constructed by the Triest Con-

tracting Corp. of 247 Park Avenue, New York City. The work involved constructing the foundations, shafts and arches for 36 approach piers, anchor pier and main river pier.

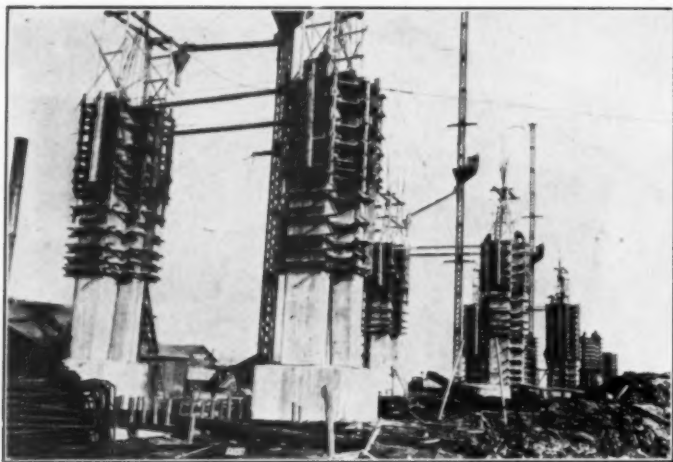
The contractor's organization arrived on the site on August 16, 1926. Excavation was started on the approach piers, August 17, 1926. The foundations for the majority of these as well as the anchor and main river piers are carried to ledge rock, which is shale. The material excavated is red clay, broken shale and clay. The holes were supported by 2-inch wood sheeting and 10 x 10 inch wales, two lifts of sheeting being used. The depth of rock varied considerably even in adjacent holes. The range was from 24 to 48 feet below ground. A small amount of water was encountered which was handled successfully by steam si-

**WINTER
CONSTRUCTION
ON PIERS 1 AND 2
HOWLAND HOOK
SHOWING
PROTECTION
WITH
TARPAULINS
WITH LIVE STEAM
UNDERNEATH**





POURING THE TOP FORMS ON THE HOWLAND HOOK APPROACH ON MAY 20, 1927, SHOWING FROM
LEFT TO RIGHT, PIER C, PIER D (ANCHOR PIER) AND PIER 1-E



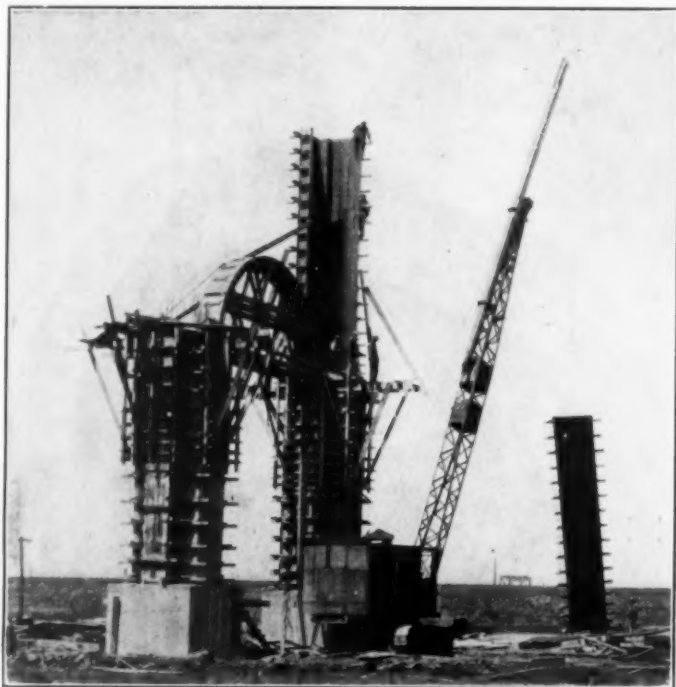
PROGRESS
OF WORK AS OF
MARCH 16,
1927
HOWLAND HOOK

phons. Two cranes, caterpillar mounted with heavy duty clamshell buckets, were used to remove the excavation.

The main river pier foundation was excavated by the cofferdam method. The excavation being carried to 40 feet below M.L.W. Thirty-foot Lackawanna steel piling was driven to refusal on broken shale and supported by five sets of bracing consisting of 12 x 14 and 12 x 12 timber. The material

encountered consisted of river silt, red clay, broken shale and shale. Shoring below the steel sheeting was not anticipated but during the construction, working through the broken shale at the toe developed leaks. It was thought advisable to carry the shoring lower, 3-inch wood sheeting being placed inside and driven to 28 feet below M.L.W. Some re-driving of the steel sheeting was necessary. Work on the cofferdam was started September 20, 1926,

CRANE
LIFTING
SIDE FORMS
FOR PIER 13
MAY 20,
1927
HOWLAND HOOK



the dam was unwatered November 17, 1926, and excavation completed January 6, 1927. Three steam pumps, two 6-inch and one 4-inch handled the water, and the muck and rock was removed by a derrick.

The materials for concreting are batched accurately at a dealer's yard about a mile distant from the work and are mixed at the work by two 27E paving mixers, crawler mounted. Concreting progressed with the excavation; no delay was caused by the Winter, 5,000 yards being placed during the month of January. The sand and stone were heated in hoppers at the yard by a blow torch inside a steel pipe, and the trucks were covered with tarpaulins to retain the heat. A small hot water boiler attached to each mixer took care of heating the water. Salamanders and tarpaulins were used to protect the concrete after placing.

Staten Island Approach

The substructure of the bridge on the Staten Island side is being done by the Frederick Snare Corporation, Randall Cremer is general manager and engineer and Mr. Cameron is superintendent of the work.

Like the Elizabeth side, it involves the construction of foundations, shafts, and arches, for the thirty-seven approach piers, anchor pier, and main river pier. The main river pier was constructed by the pneumatic caisson method and is the only pier to be so constructed. The preliminary borings had indicated clay and shale boulders mixed to a depth more than 65 feet below water line. It, therefore, was expedient to construct this pier by the pneumatic process. The wood caisson was constructed at the plant of the Staten Island Ship Building Co., Mariners' Harbor and was

ARCH
FORMS IN
PLACE ON PIER 18
WITH SHAFT
POURED
HOWLAND HOOK



Each pier consists of two reinforced concrete shafts connected at the top by an arch. The first shaft section was concreted March 7, 1927, and since then at least, 100 yards of concrete has been placed every day except Sundays. The top of the main river pier is 128 feet above M.L.W. Four 160-foot high Insley steel masts are used to deposit the concrete, each mast handling two approach piers. A crawler crane is used to place the concrete to a height of 40 feet in advance of the erection of the masts.

Shaft forms are held in place by wire rope guys to the ground and wire rope girdles. It was found advisable to make the girdles as nearly circular as practical to prevent distortion of the forms. The arch forms are supported by I-beams, two to each pier. A crawler crane erects the forms for the lower lifts, a 75-foot boom being used at times.

launched on October 16, 1926. It was kept at the ship building plant until sufficient concrete had been put in to sink it to a depth such that the cutting edge was about 23 feet below water. Early in November it was towed around to the site of the pier and, after being placed in a special pocket of a dock, it was sunk in about six weeks from the time the air was first put on.

The clay was found to be of such consistency that very little leakage occurred and pressure not greater than 20 pounds was sufficient. When in place, the cutting edge reached ledge rock at -69.

The anchor pier on the Howland Hook side was constructed by driving steel sheet piling of heavy Lackawanna section, so that the bottom edges dug deeply into the overlying rock. This was then carefully braced with wood and

excavation proceeded inside. Ledge rock was encountered at a depth of —40, which, when cleared off, received the concrete for the base. All the other piers east of the anchor pier rest on wood piles, the points of all of which, it is believed, rest on rock which was found at varying distances 30 to 40 feet below the surface. These piers were constructed by excavating inside of the wood or steel sheet pile cofferdam until fairly solid material was encountered about 15 feet below the surface, after which the piles were driven and when these were cut off, concrete was poured for the bases.

The excavation was done with a crane using clamshell bucket, the crane being crawler mounted. Concrete for the main pier C was mixed on a well designed floating plant, containing boilers, hoisting engine, two mixers and an elevating tower, also an electric light plant. The balance of the Staten Island piers was poured from a 1-yard paving mixer, mounted on crawler treads.

The work above the tops of the bases is in every way identical with that on the Elizabeth

side, and the concrete likewise was handled with Insley towers, buckets and chutes.

The entire area at the Howland Hook approach was marsh land and difficult of access. The contractor, therefore, constructed a timber causeway for his equipment. This was built by digging the material nearby with a clamshell bucket and depositing it to a depth of about three feet. On this four rows of wood stringers were placed on which were spiked 4-inch planks in a transverse direction. At the water end of the job he constructed his offices, shops, cement shed, and erected a batcher hopper for sand and stone. These materials were heated in cold weather with steam from a nearby boiler. City water was used for mixing the concrete and was brought through a 2-inch pipe from Western Avenue, nearly a mile away with the pipe covered to prevent freezing.

EDITOR'S NOTE: The front cover illustration of this issue of *CONTRACTORS AND ENGINEERS MONTHLY* was furnished through the courtesy of R. E. Brooks Co., 50 Church Street, New York, which sold the Insley concreting mast and chute illustrated to the Frederick Snare Corporation, one of the contractors for this project.

Subway Excavation by the Open-Cut Method

By DANIEL J. HAUER
Construction Economist

THERE are three methods of excavating subways in New York City. The most common method in use today is the cut and cover method, used almost exclusively for shallow excavation in congested sections of the city and more especially in the Borough of Manhattan. The second method is by means of a tunnel, used when the subway is at some depth under the surface in either solid rock or very soft ground as in quicksand. The third method is that of an open cut, where a timber decking is not placed over the wide trench. This is used in the suburban section of the city or where traffic is very light, but is seldom used in Manhattan Island.

During the past winter, two sections of new subway construction were let to one contractor on the lower part of the island, known as Sections 3 and 4 of Route 101. Section 4 runs south from 3rd Street under an extension of 6th Avenue to Watts Street. The southern terminus of 6th Avenue was formerly at 3rd Street. The city has acquired a strip of land extending from this terminus to Canal Street near the exit of the new Holland Vehicular Tunnel which goes to New Jersey. This strip is about 100 feet wide and, after the subway is completed, it is to be opened up as a street to be known as the 6th Avenue Extension. Most of the buildings thus acquired had already been wrecked, so that during the month

of March, work was started upon the excavation of this section of the new subway. For the present, only the cross streets have to have a decking or cover to carry the traffic, so that the distance of each block between the cross streets can be excavated as open cuts. This is the work to be described. Except for a station between Spring and Charlton Streets, the subway is for 4 tracks on one level and calls for an excavated trench about 60 feet wide. No rock occurs in this section, the excavation in the northern half of the section averaging about 30 feet deep. The entire work now being done, with the exception of one item, namely the bypassing of the gas pipes covers all classes of construction that are paid for under the classification of excavation.

The contractor began work at Houston and at Charlton Streets with two Bucyrus shovels, each shovel working towards King Street, which lies between the two streets named. One was a Bucyrus 20-B type shovel with a $\frac{3}{4}$ -yard dipper and the second was a Bucyrus 50-B steam shovel equipped with a $1\frac{3}{4}$ -yard dipper.

Power shovels are no longer a novelty for excavating subways in New York City, as most of the contractors engaged upon this work now use them, but, except in a few cases, the shovels used have been of the smaller sizes. This Bucyrus 50-B is the largest steam shovel and has the largest dipper of any power shovel that has

been used for subway trench excavation in Manhattan. Both shovels are of the revolving type, and began working at the street level, excavating down on the ramp dug in the subway trench and loading 5-ton trucks behind them on the ramp until the sub-grade of the trench was reached. Then the trucks continued to back down the ramp so as to be able to move forward when loaded, in going up the ramp, without turning in the excavated area.

The smaller shovel has an average of six trucks serving it, while the larger shovel requires about ten trucks to keep it busy. The

a pathway was made under King Street for the two shovels to go under the decking. Meanwhile, a crew is kept busy laying and erecting the gas by-pass pipes. For this work two Chicago pneumatic portable air compressors and a Universal crane mounted on a Mack truck are used.

As soon as the subway trench was cut through under King Street, the two shovels were taken out of the trench and the B-20 was started down a ramp at Vandam Street working north and the 50-B was started down a ramp north of Houston Street. With the completion of the



BUCYRUS 50-B STEAM SHOVEL STARTING CUT FOR NEW SIXTH AVENUE EXTENSION BETWEEN CHARLTON AND KING STREETS, NEW YORK

average load in the truck, which is heaped, means from 5 to 7 dippers full for the smaller shovel, while the same load is given with 3 to 4 dippers by the larger shovel. The time required for loading by the latter is from $1\frac{1}{2}$ to 2 minutes, while it takes about 6 minutes to load a truck with the smaller shovel.

While the two shovels were working towards one another, the decking was placed at King Street, and the sub-surface structures taken care of. A Northwestern crawler crane with a grab bucket was used at this street to excavate below the decking by openings in it, and thus

decking at Houston and Charlton Streets, the two shovels can again work towards one another excavating the trench and widening it. Meanwhile, the under-pinning of adjacent buildings will be started, the first stage of the subway construction on this sub-section will be completed and the contractor will be ready to place his steel.

So far, no sheathing and shoring has had to be done on this contract. In the part already opened up, the water-line is only about 5 to 10 feet above the sub-grade, and the material is a red sand that predominates in this part of the

Island, with just enough clay in it to allow it to stand up at a slope varying from $\frac{1}{4}$ of 1 to 1, and a 1 to 1 slope. Where this material is not excessively wet, it will stand up almost straight. Farther south on this contract, where the sub-grade becomes much deeper, as at Franklin Street, where the trench will be nearly 60 feet below the street level, some shoring will have to be done, especially towards the bottom of the trench, while the top may not have to be shored, except where the excavation is close to some building.

Thus the method described will be the general one followed in excavating the subway in this contract, and in building the structure. It will be quick work and will, no doubt, mean economical construction, and explains why, at the bid price of this contractor, the cost of a mile of 4-track subway will be less than \$9,000,000, while the average cost is generally \$10,000,000 or more. On the section just north of this, which was recently let at a low price, the cost of a mile based upon the price bid will be slightly more than \$14,000,000 because of greater depth and the fact that part of it is a double deck 4-track structure, giving in all 8 tracks, and also because similar methods of construction cannot be followed in that section.

The unwatering of the soil is done by means of sumps sunk below the sub-grade. Wemlinger steel sheet piling 9 feet long is driven down by McKiernan-Terry air hammers, the sumps being about 10 x 12 feet in dimension. A gasoline driven La Bora centrifugal pump with 4-inch suction is used to pump the water into an adjoining sewer. So far, one sump located in each of the two blocks has kept the excavation free from water.

The excavated spoil is carried by the trucks to the Canal Street wharf of the Henry Steers Co., about $\frac{3}{8}$ of a mile haul. Canal Street is about the center of the contract, where the spoil is dumped upon scows and either hauled to sea to be dumped or used for making land in the vicinity of New York. The scow contractor makes a charge for this service.

With the two shovels and the two cranes,

from 1500 to 2000 cubic yards of excavation is made in an 8-hour day and thus at a price of \$6.80 per cubic yard a daily estimate is earned for this one item of from \$10,000 to \$14,000. This contract involves more than \$14,000,000 and in order to complete the work on time, a monthly estimate of work done must exceed \$410,000 or about \$16,000 for each work day. With two 8-hour shifts it can be seen that can readily be done, especially if work is carried on at several points, which will be done within a short time.

The boom on the Bucyrus 50-B shovel, as equipped at present, must have a height under the decking of about 25 feet to clear the top of the boom. Another boom to carry the same capacity dipper has been ordered to be used in a clearance height of 16 feet, so that later this shovel will be able to go under any of the decking as this distance is less than the difference between the sub-grade of the subway and the top of the completed structure. It is these low types of power shovels that have permitted their general use for subway excavation even where the cut and cover method has been used and the depth of the trench is not more than 25 feet, which is about the minimum.

The trucks being used for hauling are Pierce-Arrows, Internationals and Macks. The contractor for this work is The Rosoff Subway Construction Co. Samuel Rosoff is President and J. H. Fisher is Superintendent of this contract. This company now has contracts for four sections of subways amounting in all to about \$25,000,000 of construction. Although they hire some trucks for their work from trucking contractors, yet some of the trucks used, a fleet of Pierce Arrows, are owned by a subsidiary company, The Rosoff Haulage Corp.

Robert Ridgway is Chief Engineer, Board of Transportation of the City of New York. J. O. Shipman is Division Engineer of the first division, under whose supervision this contract comes, while C. A. Hunt is Assistant Division Engineer in charge. C. H. Busath is Section Engineer of Section 4, and C. J. Gaffney of Section 3.

Kinney Becomes General Manager of Cyclone Fence Co.

THE Cyclone Fence Co., Waukegan, Ill., has announced the appointment of J. H. Kinney as General Manager. Mr. Kinney succeeds J. W. Meaker, who resigned as General Manager recently to become President of the Bates Valve Bag Co. of Chicago. During the three years which Mr. Meaker had served as General Manager and Treasurer of the company, Mr. Kinney was closely associated with him as General Sales Manager and

was considered well deserving of promotion to the position made vacant by Mr. Meaker's resignation. Mr. Kinney has been connected with the Cyclone Fence Co. since 1910. Other appointments in the Cyclone Fence Co. are H. G. Chapman, General Sales Manager; W. F. Kirkham, Treasurer; W. N. Jensen, Assistant Treasurer; R. E. Pinniger, Eastern Sales Manager with offices at Newark, N. J., S. W. Burr, Sales Mgr. at Cleveland.

Sam Rosoff—A Master Subway Builder

Reprinted by Permission from an Article by Russell Owen in "The New Yorker"

IN that roaring gulch under Eighth Avenue which, we are told, may some day be a subway, there may be seen almost any night, often in evening clothes, a rotund man, hat on the back of his head, bawling orders above the din of steam shovels and drills.

He wanders quickly about in the sickly light of lamps that shine on wet earth, dripping rock and pools of water. He clammers over falsework and duckboards, slips into the mud and comes up swearing, dives into a mass of workmen at one place and shows them how to do their jobs a little better, streaks his face and shirt bosom and trousers with mud, takes the hat off and puts it on until it resembles no human sort of headgear, and generally has a whale of a time.

That's Sam Rosoff looking over his subway. Sam undoubtedly thinks it is his subway—he is building it and he loves it, every smelly, wet foot of it, and just because he does love it he is doing the fastest subway construction work ever seen in New York. Incidentally, it is the first big job at which Sam has been wholly and unqualifiedly successful.

Sam has fallen down flat on his face financially time and again. But no number of financial débâcles could ever erase the unbounded optimism from Sam's soul. After every crash he has bounced up smiling, and now he is on his way to making about three million dollars from his subway—a matter which is of profound surprise, and, apparently, of little importance to him.

As a matter of fact, Sam's regard for money is such that he is permitted to have almost none of his own. There is probably no other big contractor in New York who has so many strings on his money as Sam. His friends and associates have had to build a wall around Rosoff's bankroll to keep him away from it. A wizard at digging subways, a lovable roughneck in many ways, a genius at figuring estimates so that he just scales under a competitor and makes his ultimate profit—Sam is a total loss as a financier. If it hadn't been for his wife and her profound realization of Sam's weakness he probably would never have had the opportunity to make three millions digging a ditch under Eighth Avenue.

After years of going broke periodically, Rosoff found himself two years ago the owner of a sand and gravel pit up the Hudson, two or three small engineering and contracting companies, and little else. Sam loved to spend



SAM ROSSOFF

money, even to give it away. He likes the races and prizefights and bets on both. As a crap shooter, Sam admits, he had few equals. His friends have almost weaned him from this sport. Many a time he used to drift home in the wee small hours and slip quietly into bed without a word, but there were other mornings when he would wake up Rosie, his wife, and drop forty thousand dollars on the bed with the glad words of how he had "rolled 'em." In the morning, when he awoke, he would find perhaps five thousand. The rest had vanished into what became known as the Rosie National Bank. Sam grumbled but accepted fate—and he is very fond of Rosie.

So it happened that in 1925 Rosoff put in a bid of \$4,600,000 for his first subway section under St. Nicholas Avenue, between 122nd Street and 133rd Street. These contracts are usually let by sections of ten blocks each, on competitive bidding. Rosoff's bid was entered in the name of a little company of his which had a capitalization of about \$5,000. When that bid was opened and found to be the lowest it was almost thrown out because of the insignificance of the company which made it. But he had friends to advise him, and he was told that if he posted a bond of \$250,000 he could have the job.

Sam appealed to his friend, Edward Staats Luther, whose business it is to finance companies which need help. Luther offered to put up \$150,000 if Sam put up the rest.

"Where the hell am I going to get a hundred thousand?" asked Sam querulously.

"How about the Rosie National Bank?" suggested Luther, who had heard of this almost mythical but reputedly strong financial institution.

"Gee, she'd never let me have it," said Sam hopelessly.

However, Mrs. Rosoff was called into conference. At first she was very skeptical, but after the plan had been explained to her she agreed that Sam was to be permitted to sign checks, but his signature wouldn't be worth a cent without Luther's, as chairman of the board of a new company, also on the check. Sam's salary from the construction company, of which he was to be president, was to go to Mrs. Rosoff and so into the Rosie National Bank. And Mrs. Rosoff was to get back the hundred thousand when, as, and if earned, as they say in Wall Street. If there was a loss she was to stand it first.

Such a plan called for some sporting instinct in Mrs. Rosoff and a good deal of faith in that genial person, her husband, for there were many people predicting disaster for Sam. She was more than equal to the situation.

"You have to countersign the checks, and I get the hundred thousand back?" she said. "Done."

And it was done. She got the investment back long ago, for Sam started building subways with all the enthusiastic energy of his nature and astonished his pessimistic acquaintances. Sam, who can't keep money, can build subways.

He gathered about him a good corps of engineers, since his own technical knowledge is entirely intuitive. He was the first to use ramps and trucks to get the dirt out quickly. He adapted the belt-conveyor system to central dumps from which the trucks were loaded underground. He put motor shovels down in the cut and got direct action. Soon he was setting the pace for every contractor in the city, for Sam's theory was simple and sound. The city pays for work done; therefore, do more work in a shorter time and get the money quicker.

The first section on St. Nicholas Avenue will be done a year ahead of schedule. The engineers and apparatus on that job have already been shifted to the second section under Eighth Avenue between Twenty-eighth and Thirty-seventh streets. Such procedure makes it unnecessary to duplicate equipment, and the money earned quickly uptown is put to work downtown. Some of the Thirty-fourth Street equipment has already been shifted to the third section, running from Third Street to Park Place, the biggest contract of all, calling for

the expenditure of more than \$14,000,000. Thus Sam now has three jobs, one nearly completed, representing \$27,000,000, under way at one time. Not bad for a man who a few years ago didn't have a cent to his name.

Rosoff came here from Minsk, Russia, where he was born, May 12, 1881. He is a Jew, with many of the queer deviations from type which that race shows. He left home when he was nine and went to London, where he shipped as cabin boy on a boat. After a few trips he came to New York, and wandered to Park Row one day, a tough little immigrant of eleven. He saw boys selling papers, bought a few and started to sell them. By encroaching on another lad's territory he got into a scrap exactly ten minutes later, and won the fight. He slept on gratings, and was dirty and forlorn.

"Every time I go to a Turkish bath, now," grins Rosoff, "I remember how dirty I was then."

Later he got a job as candy butcher on a West Shore train. He met Augustus A. Low, brother of the late Mayor Seth Low, who took a liking to the eager lad and gave him a job on a lumber road in the Adirondacks. That was Sam's introduction to construction work. When he drifted back to lower Manhattan he was a husky chap of eighteen, bumptious, confident, satisfied with Sam Rosoff and determined to be rich. He dressed a little better than the other fellows, wore his hat over one eye, and was nicknamed "The Whitney," because of his pretensions and cockiness.

He went back to the Adirondacks, bought a streak of rust, which had been a railroad, for a hundred dollars, and sold the materials to farmers. He worked as a laborer, took small contracts, went into wrecking. Demolishing a Protestant church was an event the memory of which still makes him grin. A tower back of the capitol in Albany was to be removed—Sam put a load of dynamite under it one night and blew it up. By morning most of it had been carted away.

Road contracts upstate interested him next, and for years he built roads, going broke periodically. Once he had only a steam shovel left and no work for it, so he traded it for some horses. There was not enough money to feed the horses and he traded them for something else. Finally, he had a pick and shovel as the result of his trades. An acquaintance met him walking along the road, with the pick and shovel over his shoulder, and asked where he was going.

"Moving my plant," replied Rosoff with that grin which makes people like him. What could

stop a man with that sense of humor?

Another time he had a steam shovel or two, and some other equipment, which he had bought, giving a note as payment. He painted out the name on the side of the apparatus, replaced it with his own name in letters two feet high and went into the local bank to borrow some money. The banker refused, but just then the steam shovels paraded by, the blatant name staring through the window, and the banker reversed himself.

But all the upstate ventures petered out, one by one, the Rosie National Bank, however, saving something each time. He next organized a steamship company, built a pier at Asbury Park, and came an awful cropper. Then he got hold of a sand and gravel pit up near Newburgh, at a place called Marlboro. Sam's luck began to turn. He made money out of the gravel pit, and it is said that he paid all the debts incurred through his Asbury Park failure.

Near the gravel pit was a dilapidated Catholic orphanage. Sam talked with one of the sisters in charge one day, and she admitted it was a rather poor place.

"Build you another," said Sam, with a grandiloquent wave of his hand.

He persuaded a brick company to give the bricks, got cement from a cement company, put into it about twenty thousand dollars' worth of labor himself, and presented the astonished sisters with a new hundred-thousand-dollar orphanage. Every year he sends the children turkeys from his farm near by. In much the same manner he built a Catholic church for a priest he liked.

"Why not do something for your own people?" one of his Christian friends asked once.

Sam grinned slowly.

"Oh, I do," he said, "but, then, they can take better care of themselves, anyway."

Generous, profane, boisterous, conceited, rough and uncouth in many ways, Sam simply can't refuse to help anyone he thinks needs it. That is one reason they take his money away from him. One day he sent a man up to Luther, and telephoned ahead that he had endorsed his notes for several thousand dollars. He wanted Luther, keeper of the purse strings, to make them good. Luther demanded

what for.

"Oh, he loaned me money when I didn't have a nickel," was Sam's answer.

"What are you going to do with a fellow like that?" was Luther's comment.

In his office he is the most incongruous figure imaginable. A huge room with a big desk at the end of it, and many papers covered with dust, obviously untouched, for Sam doesn't bother much with papers. When we last saw him there he sat behind the desk, a two days' beard on his face, hat crumpled to a peak on the top of his head, cussing into the telephone in a husky bass that rasped like a buzz saw. He had been fighting the subway fire for two days. When it started he was on his way to his mother's in Brooklyn for Passover (he himself lives on West End Avenue with his family) and was in evening clothes.

"Took charge of it myself," said Sam. Naturally, he would.

One of his greatest joys is to dine with friends, all togged out in dinner clothes, and then drag them down to his subway to show them how he can meet the boys on their own muck, so to speak. The noise and the wet and the slime, the roar of drills and the crunch of shovels, are meat and drink, music and the theatre to Sam.

One night he drifted into Dinty Moore's for a lot of corned beef and cabbage—and Sam loves to eat. A friend was congratulating him on getting his last big contract, and he added:

"Well, I'll say one thing for you, Sam, you don't get swellheaded about it."

"Ho, ho, what the hell should I get swellheaded about?"

Nevertheless, he thinks pretty well of Sam Rosoff. He is inclined to believe that Sam Rosoff is about the best contractor in the world, that Sam Rosoff's subways are the best built subways in the world, that Sam is a good guy, and has the best wife and two of the finest boys in the universe, and he doesn't care who knows it.

And Sam's conceit is so genial and free from guile that his friends love him and say:

"There's nobody like him."

And there probably isn't.

Ferguson Joins Interstate

THE Interstate Machinery & Supply Co., 1006-1010 Douglas Street, Omaha, Neb., has announced that L. C. Ferguson is now in charge of its Construction Equipment Department. Mr. Ferguson has been in the construction sales work for nearly twenty years, having been with two of the large construction equipment distributors in the west for a number of years.

Willamette Represents Galion

THE Galion Iron Works & Mfg. Co., Galion, Ohio, has announced that the Willamette Equipment Co., Portland, Ore., is now acting as its authorized representative for the state of Oregon. The Willamette Co. will handle the complete Galion line of road graders, road rollers, motor graders and other road building and maintenance equipment.

Building the Chicago Creek Road Near Denver, Colorado

By N. C. HARTFORD

"IN this age of materialism, due to economic pressure, the average man is so absorbed with the business of getting a living that he has little time for the development of his esthetic nature," according to Clyde E. Learned, United States Highway Engineer, U. S. Bureau of Public Roads, in charge of the construction of the Chicago Creek Road near Denver, Colo. "Crepe hangers among the thinkers and historians predict the downfall of the English-speaking race because of this poignant fact, but the highway engineer who sees the light-hearted vacationists thronging the highways on holidays and week-ends, knows that civilization is safe. A few hours in the heart of the hills or in the great open space normalizes the over-worked, the over-stimulated, the neurotic.

7 per cent and on all curves the grade is compensated. The outer part of all curves is also banked so that skidding will be prevented. The minimum radius used on the curves is 100 feet which is usually confined to switchbacks. Because the road in many places overhangs the valley, heavy masonry guard walls are being built in order that the road may be safe as well as substantial.

This country is subjected to a very heavy rainfall as well as deep winter snows, so that special care has been used in the design of the drainage structures. Armco culverts with cement rubble masonry head walls and inlets are being used so that the structures will harmonize as far as is practicable with the general character of the terrain.

In the fourteen miles between Idaho Springs



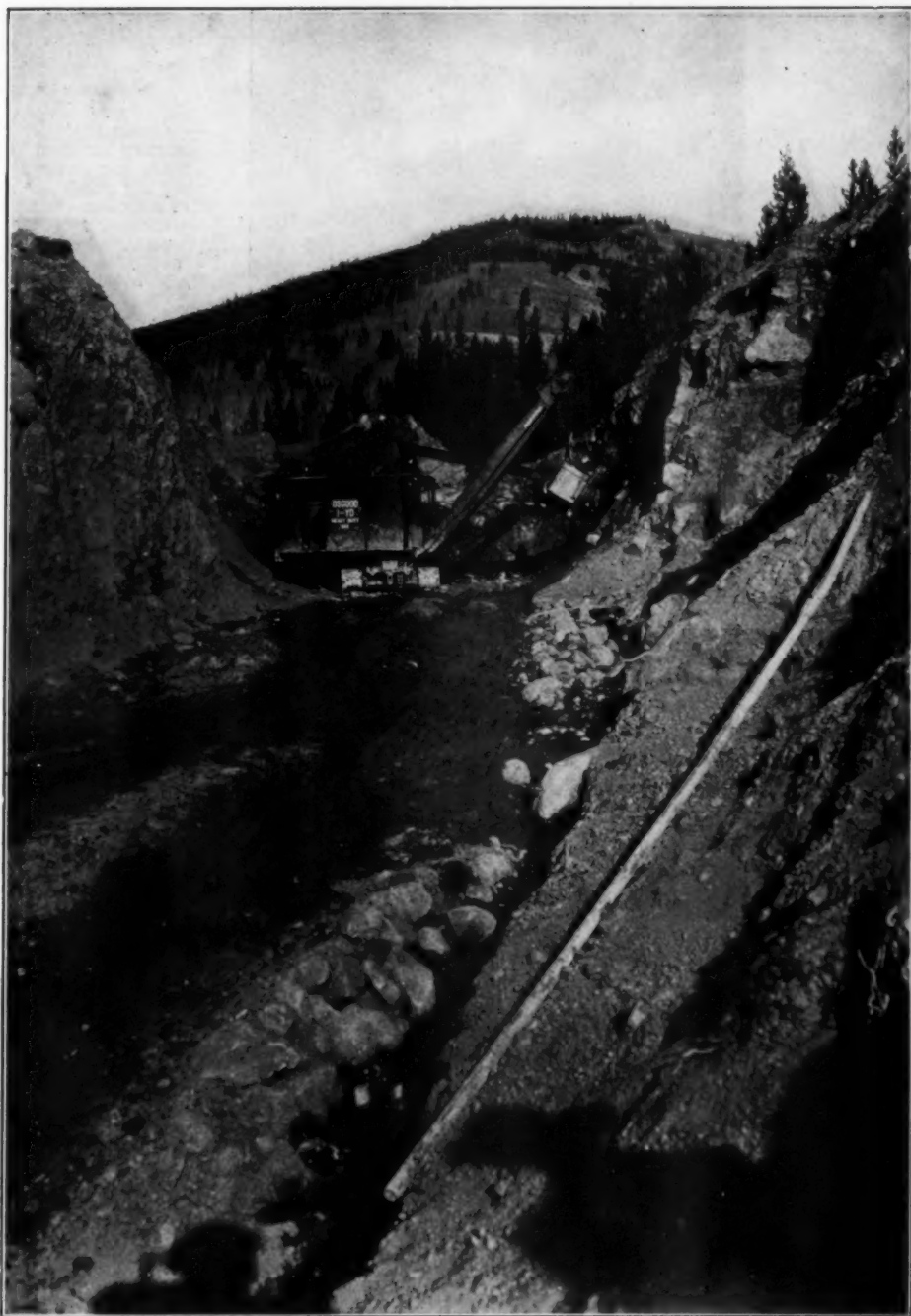
CONSTRUCTION
WORK FOUR MILES
BELOW
ECHO LAKE
OVER
EAST CHICAGO
CREEK

The gas shovel at this point made a 30-foot cut which was hauled ahead into the 30-foot fill over the cement rubble masonry arch shown under construction in a following illustration

"It is a significant fact that \$280,000 has been allotted for building the Chicago Creek Road, a road which has little or no commercial value, but is purely recreational. This road, though it climbs from an altitude of 8,000 feet above sea level to 10,600 feet, when finished will be an all-year highway, as for the most part it is built on the south slopes of the mountain. It will open up a large area for camps, summer homes and winter sports. The city of Denver has built a municipal lodge on the shore of Echo Lake, the southern terminus of the road."

Great care has been taken to ascertain the proper width, grade and drainage for this road. The standard 14-foot roadway, 22 feet from the ditch line to the shoulder was finally decided upon. The maximum grade was set at

and Echo Lake, the road ascends from an elevation of 8,000 feet to 10,600 feet, a rise of one-half mile vertically. In order to gain this elevation in such an extremely rugged country, the use of switchbacks was found necessary. At one point in the road, it will be possible to see six switchbacks winding up the mountain. There are eight switchbacks in a distance of three miles. Three miles below Echo Lake on the first switchback it was found advisable to cut the roadway through a rocky ridge, although it necessitated a through cut of 30 feet for a total length of 200 feet. In the work done during the 1927 construction season, there is a one side hill cut of 90 feet in ledge rock, 300 feet long. So far the work has been about equally divided between rock and dirt excavation.



OSGOOD ONE-YARD GAS SHOVEL AT WORK ON 28-FOOT THROUGH CUT FOUR MILES BELOW ECHO LAKE

The material excavated is being used for an adjacent 30-foot fill over the drainage structure at East Chicago Creek



AN
8-FOOT SPAN
CEMENT RUBBLE
MASONRY ARCH
110-FEET LONG ON
EAST CHICAGO CREEK
SHOWN
DURING THE
CONSTRUCTION
STAGE

This 14-mile project is being let in four contracts. The first contract of four miles, now finished, was let to the Stamey-Mackey Construction Company, Hutchinson, Kansas. Previous to the 1925 season this company had no contracts with the U. S. Bureau of Public Roads, but during the 1925 season they were awarded four contracts, and one during 1926. The contractor began work on the Chicago Creek Road on June 19, 1925, with a new one-yard Osgood crawler traction shovel, moving downgrade on prism excavation, placing the

excess yardage in windrows or piles along the outside edge. This material was later moved to place by either fresno outfits or loading into dump wagons by the shovel. The shovel made exceptionally good progress and was well adapted for this class of excavation. For the rock work, the contractor purchased a new Gardner air compressor, three jackhammer rock drills and a drill sharpener.

From Echo Lake for a distance of four miles down the road there is no water except at Sta. 75, where there is an excellent spring directly



CEMENT RUBBLE MASONRY ARCH STRUCTURE COMPLETED AND PART OF FILL IN PLACE

above the road. This spring has a uniform all-season flow, so a special rustic cement rubble masonry structure with a log trough was constructed to preserve the spring and provide an accessible and adequate water supply for the traveling public. The cement rubble masonry work was sub-contracted to Oliver Lindstrom. A structural steel grating was built for the drop inlet culvert adjacent to the Echo Lake camp grounds, to prevent careless automobile drivers from dropping into the culvert inlet, and it also facilitates the turning of cars.

Another feature of the construction was 240 linear feet of dry masonry wall 3 to 4 feet high along the ditch to prevent unstable material in the cut slope at this point from sliding into the ditch and diverting the flow of water across the road. This wall between stations 72 and 75 contained 60 cubic yards of masonry.

The second contract of 2 miles on this project now under construction was let to the

Pioneer Construction and Engineering Co., Denver, Colo. The third contract of $1\frac{1}{4}$ miles has just been let to Ed. Honnen of Colorado Springs, Colo., and the fourth contract will be let next year.

This road is a Forest Road Project being built by the Bureau of Public Roads with the cooperation of the State of Colorado, the city of Denver and the U. S. Forest Service. It will probably be finished in 1929. The U. S. Bureau of Public Roads not only constructs this highway, but maintains the completed portion while the road is under construction and when the total 14-mile project is completed will continue its maintenance for two years. The project is handled under District No. 3 of the Bureau of Public Roads located in Denver, Colo., with Junius W. Johnson as District Engineer. Clyde E. Learned, Highway Engineer of the Bureau of Public Roads, is in charge of construction.

Unique Bulkhead Protects Road from Damage by Waves

Difficult Engineering Problems Solved in Coastal Highway

THE innumerable engineering and physical problems of a highway along the Pacific Coast have been overcome and its completion will be a notable accomplishment for the California State Highway Department. State Highway No. 60 will provide a smooth highway within sight of the Pacific Ocean from San Diego to Santa Barbara, and will afford an outlet for northbound traffic from Los Angeles as well as unbounded scenic enjoyment to the thousands who utilize this course.

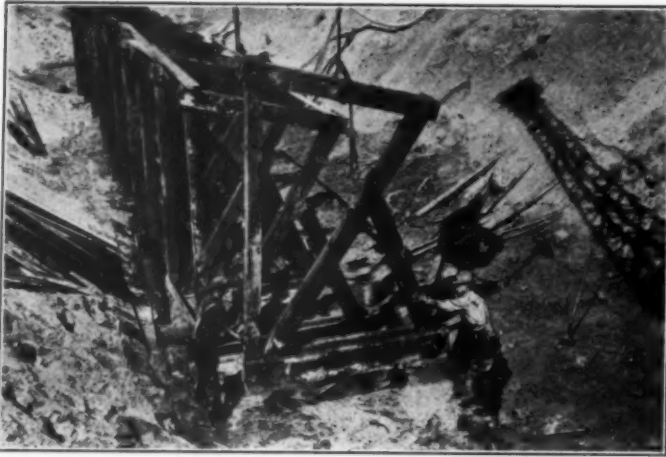
One of the most difficult problems which the engineers in charge found themselves up

against was the seasonal encroachments of the Pacific Ocean. At several points the highway runs virtually on the ocean beach, and high seas whipped up by storms have done great damage at such places, even washing away the embankment as far as the center line on the 600-foot stretch of road between Malibu Wharf and Malibu Creek.

Closely packed boulders underneath the sand were revealed by test pits sunk along this particular section of roadway. This made it impossible to drive piles for the usual type of bulkhead. A special structure was therefore

VIEW OF
THE CREOSOTED
TIMBER BULKHEAD
ON THE
COASTAL HIGHWAY
OF CALIFORNIA
BEFORE
FILLING WITH
BOULDERS AND
SAND





VIEW
OF THE
BULKHEAD DURING
CONSTRUCTION

designed and built of pressure-treated timber, and has proved very satisfactory for the purpose.

This creosoted timber bulkhead is a box-like structure, 8 feet wide at the base and 7 feet wide at the top, with a V-shaped front wall facing the ocean, and filled with boulders and sand. The bulkhead is placed 2 feet below the top level of the layer of boulders, which affords an excellent foundation. The outer end of the base is 38 feet from the center line of the highway; the inner end, 30 feet. At a point 10 feet from the pavement edge the embankment slopes a distance of 10 feet, meeting the rear wall of the bulkhead 2 to 3 feet below the top. The sand line, which is of course variable, approximately bisects the angle of the V-shaped front wall of the bulkhead.

Back pieces are 6 inches by 6 inches by 12 feet; top pieces, 3 inches by 8 inches by 7 feet, 3/4

inches; diagonals, 6 inches by 8 inches by 11 feet, 11 1/2 inches; front braces, 6 inches by 8 inches by 7 feet, 5 inches; bottom pieces, 3 inches by 1 foot by 8 feet; and 3-inch by 12-inch pieces line the two sides and bottom of the structure. The bulkhead required the placing of 101 bents, making a total length of 600 feet.

All timber used was creosoted under pressure, in accordance with State Highway Department specifications, with absorption of 12 pounds of creosote per cubic foot.

The design and construction of this bulkhead were executed under the supervision of S. V. Cortelyou, Division Engineer, Division VII, California State Highway Department. Mr. Cortelyou, the *California Highways Magazine* and *Wood Preserving News* furnished the information for this article.

ACKNOWLEDGMENT.—Illustrations courtesy of *Wood Preserving News*.

Akron Barrow Company Changes Name

ANNOUNCEMENT has been made that effective September 1, 1927, the name of The Akron Barrow Co., 3140 East 65th Street, Cleveland, Ohio, will be changed to General Wheelbarrow Co. The General Wheelbarrow Co. remains under the management of those who have been responsible for its consistent progress.

Insley Purchases Pioneer Bucket

THE Insley Manufacturing Co., Indianapolis, Ind., has announced the purchase of the Pioneer Bucket Co., also of Indianapolis.

Garber Joins Thew

THE Thew Shovel Co., Lorain, Ohio, has announced that M. B. Garber, for ten years with the Sanderson Cyclone Drill Co., Orrville, Ohio, the last five of which he served as Sales Manager, has joined the sales organization of the

Thew Shovel Co. to do special sales work in the quarry, sand and gravel, mining and railroad construction industries.

National Construction Exposition

THE Associated General Contractors of America has announced that it will hold a national construction exposition in the West Baden Springs Hotel, West Baden, Indiana, January 23-27, 1928. Every important method used throughout the general construction industries will be shown in a series of exhibits which will demonstrate all types of construction materials, supplies and accessories for industrial, engineering, governmental, transportation and special building projects. The exposition will be held in conjunction with the ninth annual meeting of the Associated General Contractors of America. The general office of the exposition is at 225 West 34th Street, New York City.

Improvement of the Plaza Site at Yonkers, N. Y.

By **NORMAN P. HENDERSON**
Deputy City Engineer, Yonkers, N. Y.

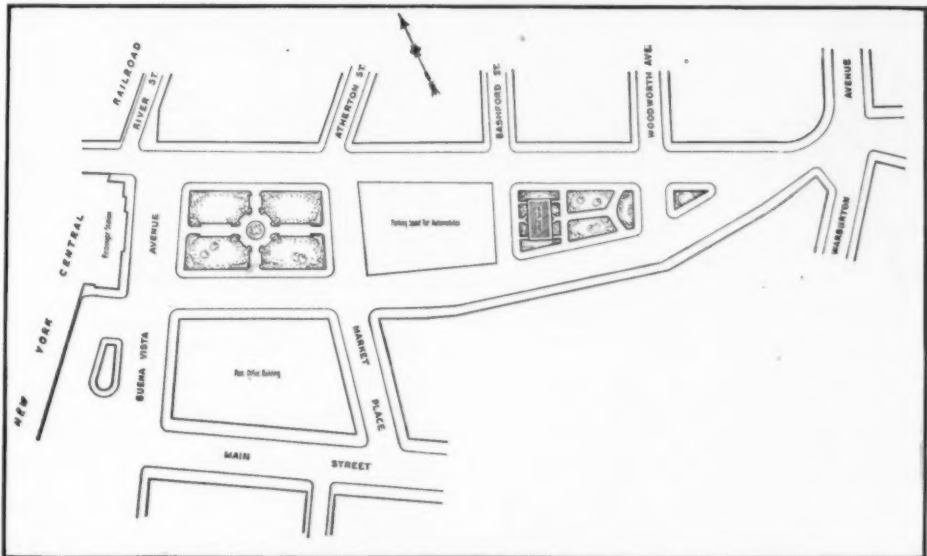
WHEN the citizens of Yonkers, N. Y., decided to improve the appearance of the property at the entrance to the city at the New York Central Railroad station and build a Plaza site, they were confronted with several engineering problems. During the construction of this improvement the approach will be widened, a river covered over, sewers will be placed and parks laid out. Through this, the people of Yonkers will obtain not only an orderly and attractive station Plaza by which, someone has said, a city is judged but also an efficient means of taking care of the rapidly growing traffic situation and affording parking space for a large number of automobiles.

The Common Council of the City of Yonkers at the proposal of Mayor Walsh and Alderman J. Curran voted to acquire the necessary property and construct a Plaza. Consequently, three blocks of property bounded by Buena Vista Avenue, Warburton Avenue, Dock Street and Nepperhan Street were acquired. Later, in order to widen the approach from the easterly end, a piece of property was taken over on

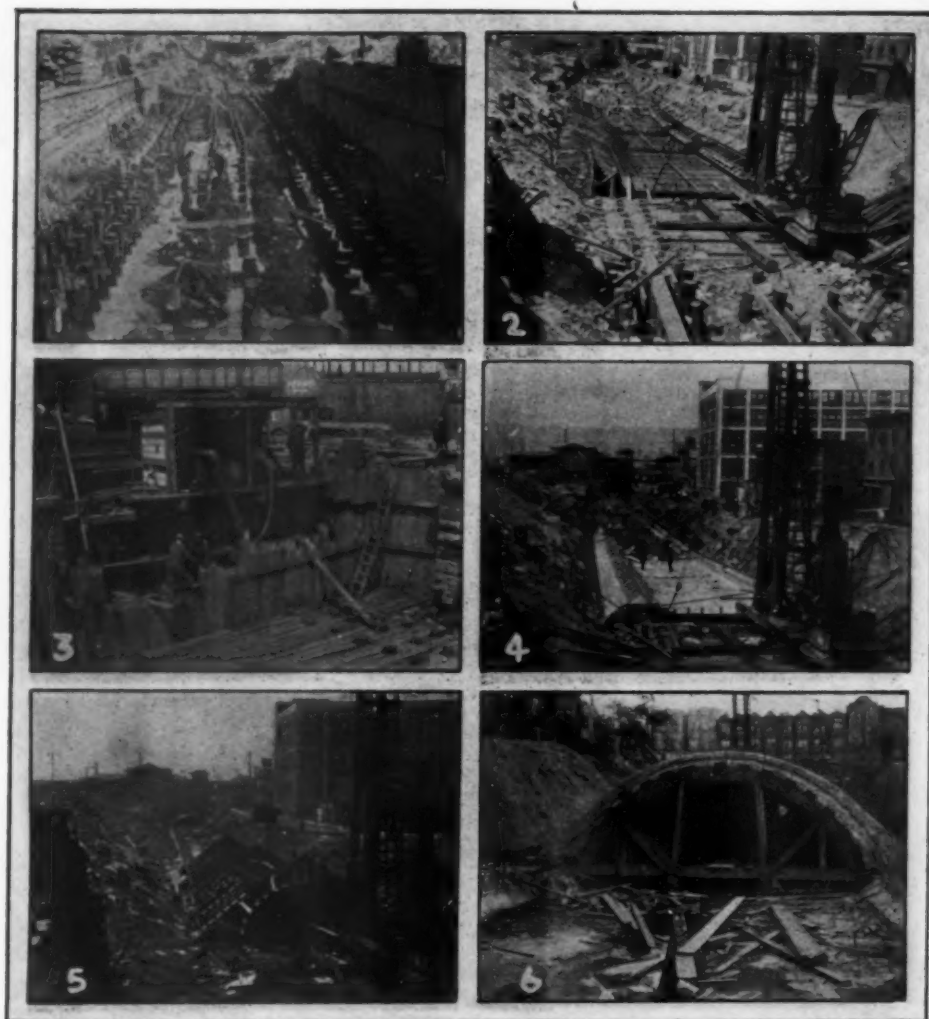
Warburton Avenue. This gave a total area of 160,000 square feet to be improved.

At the location of this improvement the Nepherhan River, which flows through the city, entered the Hudson River. As this river collects industrial and other wastes in its course through the city, it was decided it would be better to cover over the river and thus do away with the objectional appearance. This is being accomplished by the construction of a concrete culvert 20 feet wide by 8 feet high which picks up the river at the westerly line of Warburton Avenue and by changing its course carries it to the old outlet at the westerly line of the improvement.

Over this river culvert the surface will be laid out in three park sections and one large open space will be used for the parking of automobiles. The width of the streets in this area will be 60 feet. New sewers will be placed throughout to accommodate the new buildings which this improvement will bring on as the existing buildings are of such a character as to call for rebuilding. The Federal Government has let already a contract for the construction



SERVICE PLAN OF THE COMPLETE PLAZA AT YONKERS, N. Y.



PROGRESS PHOTOGRAPHS OF WORK ON THE PLAZA AT YONKERS, N. Y.

1. Photo taken April 5, 1927, showing stringers being fastened to piles with finished deck in background. 2. Photo taken April 11, showing reinforcing rods and forms set for inverts. Piles and decking in foreground. 3. April 18, driving sheet piling at river end of culvert. 4. April 18, invert concrete looking west. 5. May 6, arch centers and steel reinforcing in place. 6. May 18, arch centers on concrete poured

of a Post Office on the entire block on the southwest corner of the new Plaza.

The principal items on this work are 3,500 lineal feet of granite curb, 26,000 square feet of sidewalk, 2,000 square yards of brick pavement, 700 cubic yards of general excavation, 20,000 cubic yards of trench excavation, 14,000 cubic yards of fill, 2,900 cubic yards of 1:2:4 concrete in the structure enclosing the river, 167,000 pounds of reinforcing steel, 45,000 lineal feet of piles, 92,000 F.B.M. timber,

3,000 feet of sewers, 1,100 square yards of "Amco" liner plates, and 10,720 square yards of granite block paving. The contract for this work was let to Anthony Cianciulli, of Yonkers, for \$427,592.

The principal equipment used on the work has been: three steam shovels, a Northwest Bill, a Northwest Chief and a Northwest Eddie; one pile driving machine; one compressor; one 8-inch and one 4-inch Barnes centrifugal pump, and one Smith power mixer.

A Typical New England Sand and Gravel Plant

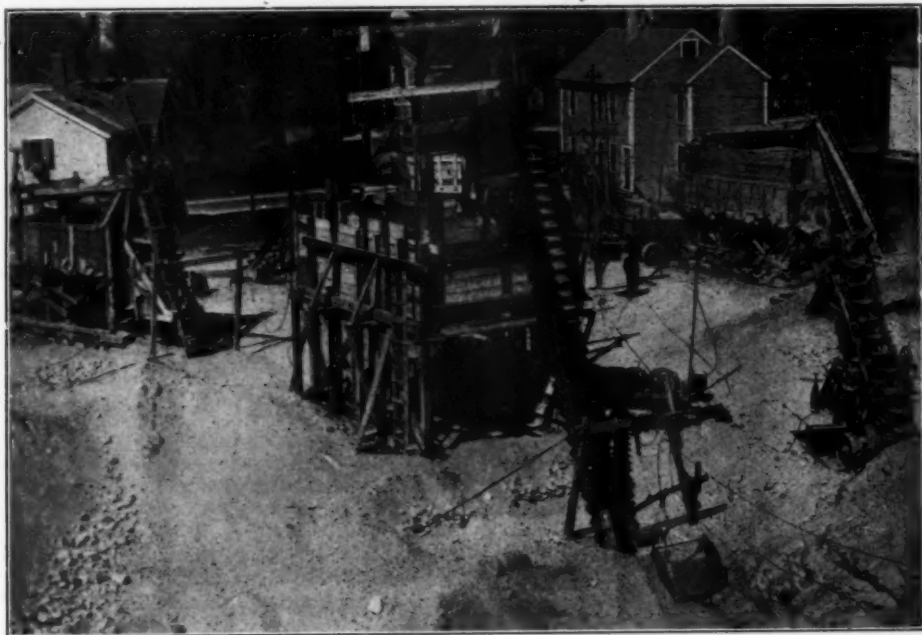
By J. B. COLBY
Attleboro, Mass.

THE plant of the J. H. McCabe Sand & Gravel Co., Taunton, Mass., is typical of many sand and gravel plants in New England. The central plant of this company has a normal capacity, is simple in construction and sturdily built. A capacity of 80 yards per hour was desired, but the plant was designed for a fifty per cent increase over these figures by changing the feeding equipment.

The rotary screen, furnished by The Bond Co. of 84 High Street, Boston, Mass., is an 18-foot, 42-inch Dance heavy-duty roll drive

crusher. Three reinforcing bars $\frac{1}{2}$ -inch x 3 inches x 3 inches are bolted on the outside of the screen proper to overcome any tendency of the screen to sag. There was furnished with the screen a 12-foot sand jacket, but having given very satisfactory results without it, it has not been attached.

Installed with the screen is a 38-foot Chicago Automatic Conveyor Co. double chain continuous bucket elevator, also sold by The Bond Co. Buckets 13 inches x 11 inches x 9 inches are attached to extra heavy riveted chains. The



GENERAL VIEW OF THE McCABE SAND AND GRAVEL COMPANY'S PLANT AT TAUNTON, MASS.

built on a 6-inch I-beam frame as a complete unit, the 4-drive rolls being 17 inches in diameter, with a $2\frac{1}{2}$ -inch face, with the screen assembly rotating on these rolls in two heavy channel rings. There are two parallel driving roll shafts, one at each side of the frame secured by three 7-inch babbed bearings fitted with Zerk lubricating tips. The roll shafts are $2\frac{15}{16}$ inches in diameter. The screen stock is $\frac{5}{16}$ -inch thick. The perforations are $\frac{1}{2}$ -inch, $\frac{3}{8}$ -inch, $1\frac{1}{2}$ -inch, $2\frac{1}{2}$ -inch and $3\frac{1}{2}$ -inch, giving plastering sand, concrete sand, pea stone, chestnut and a No. 1 stone and tailings for the

frame of the bucket elevator is 14-inch, 25-pound channel iron and between the receiving end shaft and the delivery, spaced equally apart, are four 10-inch x $\frac{1}{2}$ -inch hot riveted cross members to give rigidity. The chain rides on four 4-inch x 8-inch steel rolls, spaced equal distances apart. Exactly half way up the elevator are a pair of 10-inch guide sprockets to overcome side play in the carrying chains. The power is supplied to the bucket elevator through a 7-foot chain from the screen counter shaft.

The power for the entire plant is a 20-horse-

power electric motor with belt drive to the screen cross counter shaft. In this way the driving elements have been simplified to a minimum and with very satisfactory results.

The bucket elevator is fed by a Novo $\frac{3}{4}$ -yard dragline hoist and a $\frac{1}{2}$ -yard Dance diamond point dragline bucket, both supplied by The Bond Co. The dragline hoist is powered with a 20-horsepower General Electric motor, the bucket feeding into a 5- x 7-foot concrete pit at the bottom of bucket elevator 3 feet deep. By using a $\frac{3}{4}$ -yard bucket the output of the plant could be increased 25 per cent. The capacity of the plant on a 100-foot haul has easily averaged 375 to 400 yards in 10 hours.

The bin capacity is approximately 150 cubic yards which is emptied and put in stock piles when full. In the background of the photograph is an electric-driven Conant bucket

loader for loading trucks out of storage piles. This has given very satisfactory service for the past five years on light material. For bank run gravel a swinging, crowding, electric-driven Link-Belt bucket loader is used which has been remarkably economical for heavy work.

The other two screening plants shown at the right and left of the picture are portable 50-ton units with 26-inch screens and approximately 20-foot single chain bucket elevators having a normal capacity of 30 tons per hour. In front of one is installed a 12 x 18-inch Acme crusher which handles all the tailings of the three plants. The portable plants were built by the Acme Machine Co. and have been in use several years. Three $\frac{4}{5}$ -yard Autocar dump trucks are used on the longer hauls and Watson dump wagons and horses are used on the short hauls.

Speedy Work by Paving Crews Shows Good Organization

WHILE every paving contractor is interested in speed his greatest interest is in laying a pavement which will be a credit to his organization for years to come. Some interesting rapid paving has already developed this year. On June 2 at Thomasville, Ga., a crew of the Wesco Construction Co., of Chattanooga, Tenn., working on a 9-hour day, laid a total of 3832 square yards of 4-inch concrete base with a single 27-E Multi-Foote paver. Their average hourly production for the 9-hour period was 43.7 cubic yards per hour or a 1-yard batch every 77 seconds. Since the specifications called for a 1 minute mix, it is evident that the crew was well organized to supply the paver with material and to spread the concrete on the subgrade.

Another interesting record also with a 27-E paver is that of a crew of the Tibbetts Construction Co., which built 1515 feet of standard Bates type 20-foot pavement between sunrise and sunset on May 14 on the LaPorte Highway out of Houston, Texas, working 14 hours and 15 minutes. The pavement was laid 20 feet wide and 6 inches

thick, giving them an average of 39.37 cubic yards per hour over the long working day. This is at the rate of a cubic yard every 92 seconds where the specifications call for a 1 minute mix. This crew has been consistently building pavements at a high rate, having built more than 1,300 feet per day four times within a month. This performance was said by J. L. Harrison, Efficiency Expert, U. S. Bureau of Public Roads, Washington, D. C., to have surpassed any single day's work which had come to his attention.

Another job on which a very consistent record of fast work has been made is that of the Dorsey Construction Co. of Findlay, Ohio, on the super-highway being constructed out of Cleveland. This highway is 36 feet wide and is being paved with an 11-inch slash laid half at a time. Using a 27-E paver, this crew has been consistently building more than 500 feet of 18-foot slab 11 inches thick per day. The contract calls for 8 miles of 36-foot pavement and it is expected that the entire contract will be completed this season with the single paver.

Convention of the American Institute of Quantity Surveyors

THE Second Annual Convention of the American Institute of Quantity Surveyors held in Washington, D. C., June 6-8., showed very good progress in the activities of the Institute for the last year. The Convention was attended by professional quantity surveyors from every part of the United States, as well as representatives of the Trade and Dealers Quantity Surveying Bureaus, the American Institute of Architects, United States Department of Commerce Committees on Wood Utilization, Simplified Practice and the Supervising Architects Office of the Treasury Department. Some of the addresses covered simplified practice

applied to construction, quantity surveying applied to wood utilization, evolution of the construction industry in America, quantity surveys and the owner, methods of guaranteeing surveys, quantity surveying and the architect and surveyor, etc.

The officers elected for the coming year are President, Oscar Euphrat, Cincinnati, Ohio; First Vice-President, F. H. Hunter, Boston, Mass.; Second Vice-President, H. L. Cunliffe, Seattle, Wash.; Secretary, F. E. Dischner, Detroit, Mich.; Treasurer, G. Szmak, Bridgeport, Conn. It was voted to hold the Third Annual Convention in New York City in June, 1928.

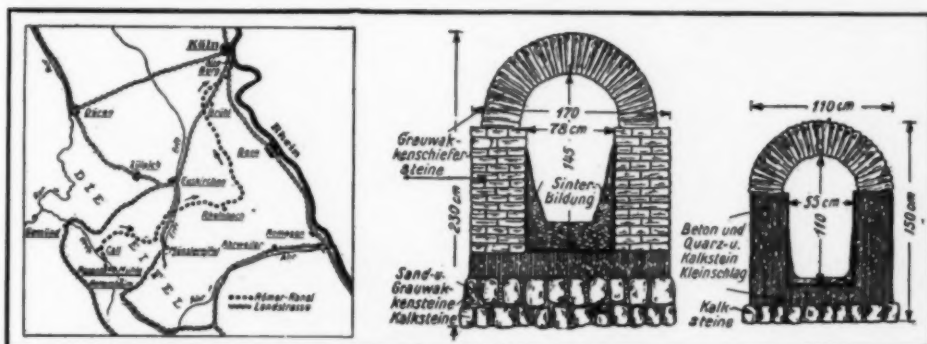
Old Roman Water Tunnel Shows Careful Construction

IN the *VDI-Nachrichten* of May 11, 1927, Nelissen writes that one of the remnants of the ancient Roman civilization in Germany is the subterranean water supply line from the Eifel to Cologne. Judging from the map in Figure 1, the tunnel must be about 50 miles long. The spring at the upper end was entirely walled and roofed to assure a clean supply of water. Across the small river are the remains of an old house, probably that of the caretaker.

pounded brick and trass.

Farther down the line where more water was taken in, the tunnel is larger. Here the floor consists of a 15 cm. (5.9 inches) heavy plaster of small stones on which rests the 20 cm. (7.9 inches) foundation of larger sharp-edged adjoining sand stone and gray slate stone blocks. Above this is a 23 cm. (9 inch) trass flooring as in the smaller canal. However, the side walls are different as seen in Figure 3.

The tunnel is beneath the surface except in



OLD ROMAN AQUEDUCT IN GERMANY

At left, map of the vicinity of Cologne showing the Roman tunnel indicated by the heavy dotted line; center, cross-section of the Roman tunnel at its upper end; at right, reduced cross section of tunnel farther down the line

At the beginning and the end, the side walls of the tunnel are of a concrete mixture of broken quartz and lime stone as shown in Figure 2, while the other side walls are constructed of a gray rock slate as shown in Figure 3. The arched ceiling is finished in masonry of gray slate stone throughout. In the upper section the tunnel has an underlay of lime stone 15 cm. (5.9 inches) deep on which rests the 20 cm. (7.9 inches) flooring. This concrete flooring is covered with a reddish mixture of finely

one place where it passes a valley on an arched bridge. At the head, the canal has an inside width of 55 cm. (21.7 inches) and an inside depth of 110 cm. (43 inches). The dimensions of the canal increase gradually until it is 78 cm. (31 inches) wide and 145 cm. (57 inches) deep.

Judging from the accumulation of sinter, the canal must have been used several centuries. The project was worked out with great care. The water as it is to-day, is hard, cool and tastes good.

Lakewood Distributors

THE Lakewood Engineering Co., Cleveland, Ohio, has announced the appointment of the T. J. Lane Equipment Co., Springfield, Ohio, as agents for the complete Lakewood line in the central Ohio territory. The Mechanical Supplies Co., Cincinnati, Ohio, has been appointed to handle its complete line in the Cincinnati territory and adjacent Kentucky counties. J. B. Miller is President of the Mechanical Supplies Co., and is in charge of sales. This company has been serving the industrial field as well as the contracting field for the last ten or twelve years and is now opening a construction machinery department in addition to its regular supply business.

Climax Announcement

THE Climax Engineering Co., Clinton, Iowa, has announced that its Chicago office has been removed to 1608 Harris Trust Building, 111 West Monroe Street. This office was previously located in the same building, but on a different floor. F. E. Blanchard is in charge of the Chicago branch of the Climax Engineering Co.

The J. L. Lature Equipment Co., Portland, Ore., representing the Climax Engineering Co., in Oregon, Washington and Idaho, is now located at 312-314 East Madison Street, Portland, Ore. The new location is in a four-story fireproof building and will house both office and warehouse of the Lature organization.



BOLTING A 10-TON SECTION OF PENSTOCK TO THE CLIFF IN KINGS RIVER CANYON, CALIF.

Concrete Anchors Hold Penstocks to Mountain Side

Unusual Construction Problems Arise in Building Penstock to Operate Under Highest Head in America

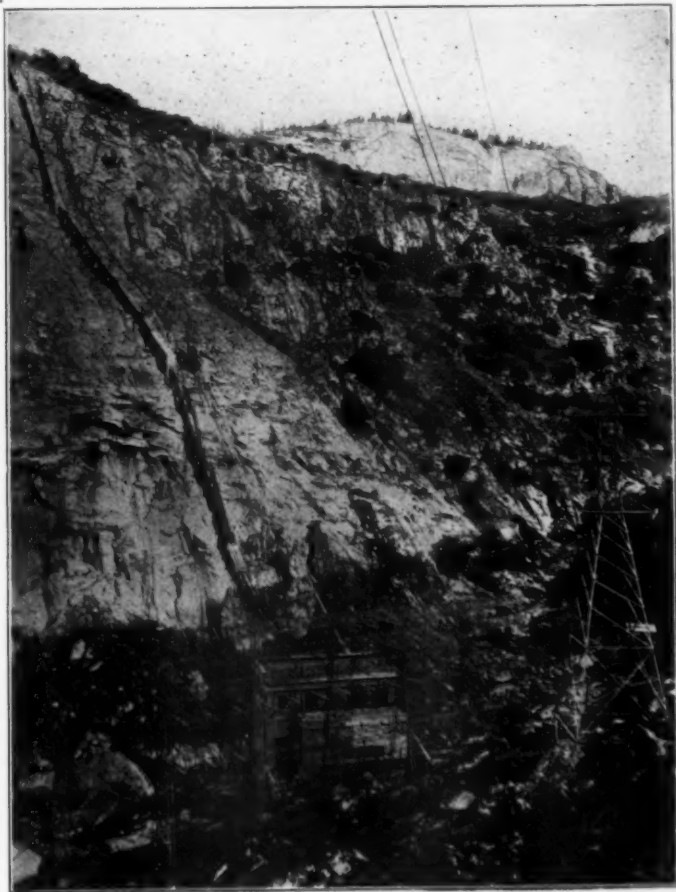
THE new Balch hydro-electric power plant in California recently completed by the San Joaquin Light and Power Corp. operates under a head of 2,381 feet, giving it the distinction of being the highest head plant in America at this time. One of the most difficult problems of construction was the anchoring of the penstocks to the mountainside. The penstock line consisted of more than 200 pieces of steel pipe, each a good load for a 7-ton truck. Most of this pipe was delivered at the Patterson Camp, which is midway between the power house and the tunnel—a point cut into the steep hillside where storage space was at a premium. The pipe was loaded at Piedra according to its position on the incline, each piece

going into place immediately on arrival.

A novel device was developed to handle the difficult problem of placing the pipe in its proper position on the steepest point on the side of the cliff. This consisted of a crane mounted on four wheels traveling on rails. The heavy pieces of pipe were swung in chain slings suspended from four 4-ton hoist blocks. By means of this control the pipe was lowered to the exact position where it should rest. More than 5,000 feet of specially made steel cable was wound around the huge drum at the incline hoist at the top of the grade.

While the penstock rests on concrete piers placed 30 feet apart, line was held in place by means of massive reinforced concrete anchors,

VIEW
OF COMPLETE
PENSTOCK
SHOWING METHOD OF
ANCHORING
Power house
and switching rack
are shown in the
foreground





GENERAL VIEW OF THE BALCH PLANT DEVELOPMENT ON THE KINGS RIVER PROJECT OF THE SAN JOAQUIN LIGHT AND POWER CORPORATION

The black pipe line can be seen leading down from the mountain at the left to the power house in the center of the illustration

the largest being 42 feet long and 29 feet high. This anchor, placed at a bend in the line where the pipe is almost perpendicular, weighs 1,650,000 pounds and is designed to resist a horizontal stress of more than one million pounds.

The diameter of the penstock at the point where the penstock line connects with the tunnel is 60 inches which is reduced 4 inches at a time to 48 inches at a point a few hundred feet above the power house where the line is divided into two 34-inch lines which pass under the river in a concrete anchorage before reaching the power house. Because the canyon where the power house is located is steep and narrow it was finally decided to cross the river with the penstock in order to take advantage of a better site on the far side. The rock danger was also a factor in locating the power house away from the very steep slope down which runs the penstock. The lower portion of the penstock is subjected to such tremendous pressure that it is reinforced by steel bands shrunk on, this work being done in a special plant in Poland. A typical section has 4 by 1½-inch bands spaced 9¼ inches on centers.

Provisions for Expansion

Because of variation in temperature, the penstock which is 4,882 feet in length must have provision for expansion and contraction lengthwise. With a variation of 100 degrees Fahrenheit, the total expansion from the tunnel to the power house was estimated to be 3 feet 2 inches. If the pipe were rigid, it would be liable to buckle and force itself out of place as it expanded. To avoid such disastrous consequences, expansion joints were provided at each of the fourteen anchors. Movement of the pipe on the supporting piers is made possible by a slip shoe of steel bolted to the pipe which slides on a curved saddle bolted to the pier. Heavy grease is spread between the shoe and saddle for lubrication. The longest section between anchors will have an estimated expansion of 5¼ inches.

Diversion of Water from River

The water for operating the Balch plant is diverted from the river by means of a concrete dam of the arch type 60 feet high above the river bed, 95 feet above the deepest bedrock

and 220 feet long at the crest. It is set in a narrow canyon resting on solid rock walls. This dam is merely intended to divert the stream through a 12 x 12-foot tunnel, 19,350 feet long, cut through the solid granite of the mountain following the contour of the country. It has a fall of 3.3 feet to the thousand, the intake being approximately 65 feet above the discharge.

Cut in the solid rock of the mountain near the end of the tunnel is a chamber shaped like a gigantic hour glass, 165 feet high and 16 feet in diameter at narrowest point and 28 feet at its base and top. This is the surge chamber and provides a means for relieving sudden pressures that might be thrown on the penstock as a result of closing the valves or gates. At the end of the tunnel a huge steel or mani-

fold 10½ feet in diameter is concreted into the solid rock of the tunnel wall. This pipe is provided with four outlets 60 inches in diameter which feed directly into the penstock. Three of these outlets have been closed awaiting future use when other units are added to the power house. Near the entrance to the manifold and at the base of the surge chamber is a pit to trap sand and small particles of rock. A small piece of rock descending through the penstock would strike the water wheel buckets at a velocity of more than 245 miles per hour with the possibility of causing damage.

The Balch plant is the first unit of an ultimate development of 495,000 horsepower possible through a series of dams, reservoirs and power houses on the north and west forks of the Kings River.

Ingenious Tile-Laying Rig Used in 2000-foot Clay Tunnel

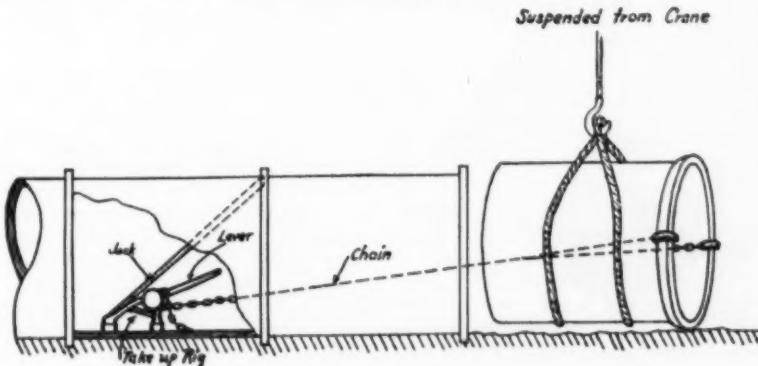
Rapid Machinery and Efficient Methods Completed Project in Record Time

EFFICIENT methods and adequate time and labor saving equipment were responsible for the completion of the Southwest storm sewer at Des Moines, Iowa, in 32 days, with two 10-hour shifts per day. The main sewer consists of 8 miles of 48 inch cement tile with 6 miles of additional branch sewers of smaller diameters, namely, 30 inches, 24 inches and 18 inches, making a total length of 14 miles.

Most of the work was open cut of moderate depth and was handled by 5 Northwest portable cranes on tractor mountings, using dragline dippers, and in some places clamshell buckets. About 2,000 feet, however, was carried through in a square tunnel 5 x 5 feet in size. Two portable gasoline engine-driven air compressors made by the Sullivan Machinery Co., 122 South Michigan Avenue, Chicago, Ill., each having a capacity of 170 cubic feet of free air per minute, furnished compressed air for a number of Sullivan clay spaders, and rotator rock drills. The material encountered was

clay and sand rock, both fairly hard. It was necessary to drill and shoot the sand rock, and Sullivan "DP-331" rotators were used for this work. The sheet piling in the shafts and in a section of the open cut was driven with a one-man pile driver operated by air from the compressors. This method was found to be very fast and the work was done at low cost.

The ingenious feature of laying the cement tile in the ditch was the use of a Sullivan takeup rig, such as is used with Sullivan coal mining machines, for pulling each tile into place. The tile was suspended from one of the cranes just above the bottom of the ditch and the takeup rig attached. This unique method was found to be much faster and far less expensive than the former method of using a heavy chain block and long rope with the block set back in the nearest manhole. The whole work was carried on with great rapidity and was completed in 11 months as compared with the estimated time of 18 months.



**SPECIAL
TAKE-UP
RIG WHICH
PLACED
CEMENT
TILE IN
POSITION
RAPIDLY**

Current Business Conditions

Analyzing Current Data from the Standpoint of the Contractor

Edited by GEORGE E. MacILWAIN, Business Economist

Business by States Today and Tomorrow

THE map of State business shows actual money transactions. Twenty-eight States show improvement over a year ago. The black and the stippled areas are the ones we all like to look at. These are the localities where the best business has been recently done. These are the localities where, according to recent records, the best business is likely. Sellers will concentrate on these States.

However, the data already at hand indicate some of the changes that are likely to occur in this map as we go into the fall. My idea is that before many months—this year in fact—we shall see the black that now marks California spread eastward to the Mississippi river. The uncertain element is the Texas cotton crop, which may fall off so as to mark Texas with dots instead of with the solid black.

Minnesota is now flanked on the west by the Dakotas in white. This condition is almost certain to turn to stipple and quite likely to black, on account of the improved crop conditions in that region and Minnesota will probably turn black for the same reason. Nebraska will change for the better, on account of her prospective corn crop. Kansas and Oklahoma are due for improvement. Likewise Missouri and Oklahoma.

These sections are likely to spend large sums the coming twelve months for public works.

Public Works and Utilities Reach Peak

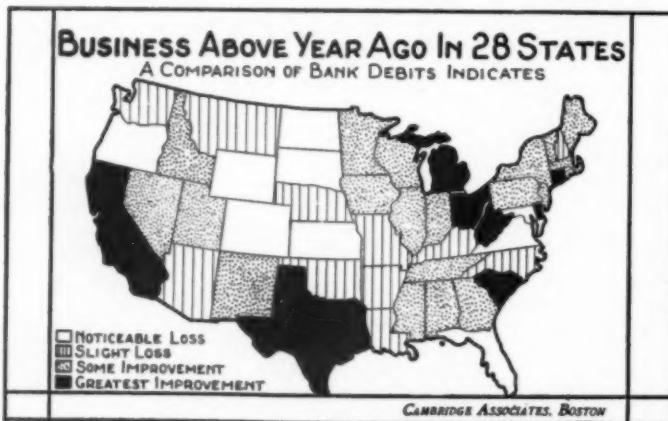
The chart on this topic shows how this line of activity has outrun previous activity. A continuation at present levels can hardly be looked for. Looking back over the line to the year 1920, one can see the cause of high taxes. Between 25 per cent and 30 per cent of current building contracts are for this line of work. Contractors should see where this kind of work now stands, with reference to the past few years, and realize that a change is imminent.

Building Costs to be Lower?

Babson predicts lower building costs this fall, to the extent of 15 per cent. He may be correct. Time alone will tell. His analysis of present material costs is worth consideration. According to his figures the main items of building stand, July 1st, as follows:

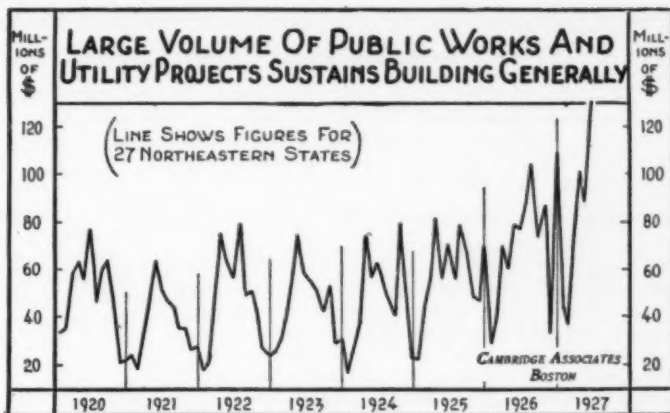
	Average 1913	July 1, 1920	July 1, 1927
Brick	\$ 6.54	\$25.00	\$17.00
Cement	1.01	1.75	1.60
Glass	2.16	7.12	2.82
Lath	4.38	16.00	6.50
Lime91	3.10	2.10
Lumber (So. Pine)...	16.66	44.06	30.45
Nails	2.00	4.00	2.50
Struc. steel	28.38	69.44	40.32

According to this table the chief offenders are: brick, lime, hardwood lumber, and steel. One may imagine hardwood holding up on ac-



CASH BUSINESS AT
HIGH LEVELS IN THE
BLACK AND STIPPLED
STATES

**THE HIGH LINE OF
PUBLIC UTILITY WORK
SINCE 1920**



count of destruction in the recent floods. But the situation in the other fields makes further reduction possible, if not probable.

For example, consider the immense increase in capacity output in the brick industry, due to war and post-war expansion and the introduction of machine processes and add to this the large importations of foreign brick and you have the setting for a drop in brick prices. Cement, too, has only *begun* to head toward the pre-war level. Competitive conditions in steel are such as to warrant hopes, at least, of lower prices.

Nothing but sustained peak demands for these materials can maintain present prices!

Babson, however, bases his prediction not only on material prices, but on improved mechanical devices in building and on improved labor efficiency, due to falling off in demand for such labor.

Considering *all* the elements, he may be correct.

Fall Business Will Equal Last Year's

We are far enough along to say, with considerable confidence, that fall business will be as good as last year's. Manufacturing activity has been sufficiently slowed down during the summer to permit consumption of the excess accumulations of stock. The feeling among business men is distinctly more optimistic than it was in July. The seasonal upturn which comes in the early fall started the last part of August. The prospect of improved automobile sales between now and Christmas affords good news for steel concerns and other industries which feed the automobile business and so on.

So that, all told, we may expect fall business to run ahead with the usual seasonal improvement and perhaps a little more. The result will be a total for the year equal to or slightly in excess of the total for 1926. This

situation calls for considerable satisfaction, when we consider the high levels attained in 1926, which was, up to then, our peak year.

Politics No Menace to Business

Sooner or later the complications of national politics are going to affect the business situation. The feeling in some quarters is that, when this occurs, the long awaited downturn in the stock market will begin. The important point to consider is that for the immediate future—that is the balance of 1927—there is no threat in the political situation.

Great pressure will be brought to bear in the next Congress to increase appropriations. The President's economy program will be subject to direct fire. The business of Contractors and Engineers will hang upon the outcome of this pressure.

As we pointed out in last month's article, a great deal depends upon the wisdom of Contractors and Engineers in following a long swing policy, instead of attempting to prolong the already too much inflated conditions of the business. Any too radical action by Congress in the way of appropriations for public works and for farm relief would carry with it a rebound which would do more to set business back than anything else.

For five years business men have felt that they had in Washington an administration favorable to business. Underlying all conditions has been a fundamental confidence in the attitude of Washington. This is the most valuable asset that the past four or five years has possessed. The great thing for all to remember, particularly the readers of this magazine, is that they must not over play their hand! Be content with less in the way of appropriations and retain the confidence of the business world. In this way the good times may be prolonged.

Legal Points for Contractors

These brief abstracts of court decisions in the contracting fields may aid you in avoiding legal difficulties. Local ordinances or state laws may alter the conditions in your community. If in doubt, consult your own lawyer

Edited by A. L. H. Street, Attorney-at-Law

Contractor's Guaranty vs. Faulty Specifications

"We will build that concrete water tower for you according to your engineer's plans and specifications, and guarantee that it will be water-tight," is what contractors said to a city, in legal effect, according to the holding of the Kansas Supreme Court in the case of *City of McPherson vs. Stucker*, 256 Pacific Reporter, 963, decided June 11, 1927. The court reversed a ruling of a lower tribunal that the city was not entitled to recover damages against the contractors.

The lower court seems to have upheld the contractors' contention that they had followed the city's specifications, using good material and workmanship, and that therefore they were not at fault because the completed work leaked. But the Supreme Court said:

"The plans and specifications . . . show that, in the waterproofing specifications, great latitude was given the contractor as to methods and materials to be used, . . . but that the contractor should furnish full specifications for such waterproofing. . . . The defendants suggested the Ferro-tite method, represented that it would produce a water-tight job, said it was guaranteed, and took a bond from their subcontractor. . . .

"The defendants failed to deliver the thing agreed upon and are liable for the natural and reasonable damages arising because of such failure."

A Judge Slips Up on a Question of Highway Contractor's Duty

It is not necessary for a contractor to marshal a private army and stand at the entry of an unopened and unfinished road and heroically say of approaching travelers, "They shall not pass!" It is enough that the contractor use a reasonable degree of care to avoid permitting a traveler to lead himself to a place of danger. Thus saith the North Carolina Supreme Court in the case of *Evans vs. Shea Brothers Construction Co.*, 138 South Eastern Reporter, 411, decided June 10, 1927.

The Evans family were driving a Ford along a road when they came to a partly completed fill branching off from the highway. This fill was made in the process of straightening the road. The old road was kept open and the Evanses should have taken the old curve rather than the new fill. An accident resulted, in the absence of the contractor's crew, and suit followed. It appeared that a large pipe had been placed across the entrance to the fill, but that some one had removed it, without

the contractor's knowledge. No signs had been posted because the old road was left open.

The jury that tried the case asked the trial judge whether or not, as a matter of law, it was up to the contractor to see to it that there was a barrier maintained across the entrance to the fill. The judge replied: "Yes; it would be the duty of the defendant to keep an obstruction there all the time so long as the public was using it, and if he failed to have a warning up there he would be negligent."

Setting aside a judgment in favor of Mrs. Evans for the injury she sustained when the automobile tipped over, the Supreme Court decided that the trial judge erred in what he told the jury, saying:

"The plaintiff left the main highway and traveled a dangerous road not opened. . . . The jury should have been instructed that . . . it was their province to determine whether defendant failed to exercise ordinary care—that degree of care which a prudent man should use and exercise under like circumstances."

Specification of Monopolized Material Did Not Invalidate a Paving Contract

The policy of the law to require the letting of public contracts to competitive bidding does not extend so far as to preclude the letting authorities from specifying that a certain kind of proper material be used by the contractor, although that is obtainable from but one source, holds the Kentucky Court of Appeals in the case of *City of Springfield vs. Haydon*, 288 South Western Reporter, 337, decided October 26, 1926.

A paving contract before the court required use of Kentucky rock asphalt, a product obtainable at the time from but one company. The court said, in reversing the holding of a lower court, that the contract was void:

"The company was not in the construction business. It simply got out its rock and sold it upon the market. It had no interest in the bids or in the work. Three responsible bids were made. To hold that there was a substantial denial of competitive bidding here is for the court to shut its eyes to the facts."

The court notes the distinction between this case and an earlier one in which a paving contract was held to be invalid because one of the bidders for the work was the only concern from which specified material was obtainable. "Under such circumstances there could reasonably be no real competitive bidding."

A Decision on the Law of Liquidated Damages

If a stone company agrees to furnish a given quantity of crushed rock to a contractor at a certain time and place for \$10,000, and fails to do so, and if it costs the contractor \$12,476.89 to get that quantity delivered at the contract place by some one else, to take the place of that called for by the broken contract, the contractor's recoverable damages can be figured down to a cent, \$2,476.89.

But if a contractor agrees to construct a drainage ditch according to certain plans and specifications for a certain price and by a certain time, the damages resulting from a breach of this contract is obviously not subject to even approximate computation. Therefore, the courts with practical unanimity hold that such contracts validly may provide a fixed, arbitrary sum to be paid as damages in case of breach of the contract—liquidated damages. Such provisions are not ordinarily permissible where the actual damages are subject to computation.

In the case of *Blue Earth County vs. Bisballe*, 213 North Western Reporter, 30, decided by the Minnesota Supreme Court, March 25, 1927, it was held that a provision for payment of \$10 for each day that a ditch contractor should be in default in completing his contract was valid, and binding upon his surety as well as upon him.

But the court said: "The liquidated damages are clearly intended to cover the damages for failure to deliver within the stipulated time a ditch which substantially functions as a drainage system. It was never intended to cover a case where, because of a defect in some small branch, that branch did not properly drain, or where on account of negligent or improper laying of the tile, the use of the drainage system develops conditions which impair its intended efficiency. There is no allegation as to what extent the drainage system failed to carry off the water, or for what period. If, when the job was supposed to be finished, the drainage intended was had, the penalty for delay was at an end. The same would be true if there was a partial failure only, for the liquidated damages must be construed, at least when the county brings suit, as accruing from a total failure to have the full drainage contracted for, and not from a partial failure of the system to function from a negligent construction."

Drainage District Contractor Wins Important Point

A county failed to prove a right to recover against a tile ditch contractor on the ground of negligent construction, held the Minnesota Supreme Court in the case of *Blue Earth County vs. Bisballe*, 213 North Western Reporter, 30, decided March 25, 1927. Observed the court:

"The capacity in which plaintiff acts in drainage undertakings should be kept in mind. It is not the

proprietor of a drainage system. The damages resulting from a breach of the contract for the construction there do not go to the county. The county is merely the governmental agency charged with the duty of carrying out the undertaking. It ought to see to it that contracts for drainage construction are performed promptly and according to its terms. Therefore, where defects are discovered after acceptance and payment, the county should speedily remedy them itself, or cause it to be done by entering into a contract therefor. The cost or obligation thus incurred would accurately measure the damages recoverable for the negligent or defective construction. The county suffers no damages, unless and until it repairs the defects in the contractor's work or obligates itself therefor, and gives or secures to the real beneficiaries the drainage called for by the contract. When it does this, no uncertainty or conjecture will remain as to the damages recoverable."

All Defects in Work Are Not the Builder's Fault

A concrete pier was constructed in Rio de Janeiro. Nearly two years later, and under its first heavy load, about 4,000 tons of coal, it collapsed.

"Fault of the contractor," said the owner. "Fault of the plans," said the contractor. Suit followed and the United States District Court for the District of Maine holds (*Compagnie Du Port de Rio Janeiro vs. Mead Morrison Manufacturing Co.*, 19 Federal Reporter, Second Series, 163, decided April 24, 1927) that the owner failed to prove that the contractor was at fault. The court said:

"Assuming, however, for the purposes of this discussion, that the cause of the accident was due to faulty construction, it remains to separate the fault of the contractor from the fault of the contract."

"A certain type and method of construction was called for by the contract. The contractor was not permitted to deviate from this and cannot be charged with its faults. . . .

"Assuming that the poor condition of the concrete in the piles after the collapse was due to their having been driven with heavy blows into hard bottom, it still must be shown that such driving was unnecessary, or that the severity of the driving was beyond what was required to comply with the specifications. . . .

"The fact is that we have to guess what was the cause of the accident. If we should guess that it was partly because of heavy pounding, we are met by the fact that there is no proof that they could have penetrated the ground with any less. If we should guess that it was partly due to being driven before being fully dried, we find that the only drying period called for by the contract was more than fully met."

Complete Portable Compressor Plants in Two Sizes

Air Compressor and Gas Engine Built Into One Unit

COMPLETE compressor plants now being built by the National Brake & Electric Co., Milwaukee, Wis., consist of portable gas engine-driven air compressor units, the gas engine and air compressor being built as an integral unit. The cylinders of both compressor and engine are mounted on a single crankcase. The four gas engine cylinders and two air cylinders are bolted to this crankcase with a 1-piece crankshaft of special design delivering power to the combined unit. The engine and compressor bearings and connecting rods are identical and interchangeable.

The compressors are intended for operation of any pneumatic equipment where reliability, durability, as well as low operating and maintenance costs are paramount. They are now available in two standard sizes—110-cubic-feet and 160-cubic-

adjustable. The flywheel is furnished with a ring gear so that electric starting equipment can be installed if desired.

The crankshaft is a 1-piece drop forging, heat treated and accurately balanced. The crankshaft and connecting rods are of liberal design and fitted with bronze bearings lined with high-grade bearing metal. This shaft has six throws, four of conventional design for the engine cylinders, and two 180 degrees apart and 90 degrees from the plane of the engine crank, for the air compressor cylinders, thereby insuring the absence of vibration.

The engine is lubricated by the combined force feed and controlled splash system. The cooling system consists of radiator, fan and centrifugal water pump.

The compressor is of the duplex, vertical, single-



NATIONAL 160 CUBIC FOOT PORTABLE COMPRESSOR MOUNTED ON STEEL TRUCK WITH STEEL TIRED WHEELS

feet piston displacement per minute. Either unit is available in any of the conventional mountings, such as on skids, on steel axles with steel wheels, on steel axles with rubber-tired steel wheels, and on steel axles with spring suspension and rubber-tired steel wheels.

The engines are vertical, 4-cylinder, 4-cycle, valve-in-head type with removable cylinder heads. They are designed particularly for high efficiency and ability to deliver uninterrupted service over long periods with minimum cost for operation and maintenance. The cam shaft is gear-driven and the motor has a removable head, permitting ready inspection of valves and simplifying the removal of carbon, when necessary. The fan is belt-driven and

acting, single-stage type. The cylinder head is removable, both suction and discharge valves being contained in the head. The cylinders and heads are completely water jacketed.

Standard equipment of this unit consists of Eisman magneto with impulse starter, Zenith carburetor, engine muffler, self-cleaning United centrifugal air cleaners for engine and compressor, thermostatic water control valve, gascolator and engine primer. It is regularly furnished with steel canopy top and sides and all necessary wrenches. Either size unit can be supplied mounted on a Ford 1-ton truck chassis or can be furnished less running gear for mounting on a Ford truck by the purchaser.



**FLEET
OF BARRYMORE
CONCRETE
MIXER TRUCKS
BEING LOADED
WITH ROCK AND
SAND**

Note
measuring hoppers
built in
connection with
each storage
bin

A Certified Concrete Mixing System

New Methods That Obtain Responsible Results for Building and Paving

A NEW system of concrete mixing has recently been developed that makes the sale of ready-mixed concrete satisfactory to owners, architects, engineers and contractors. Under the old system of selling ready-mixed concrete, where the materials were mixed at a central mixing plant in a rotary drum mixer of 1- to 2-yard capacity, then hauled to the job, the disadvantages of segregation of heavier materials from the lighter materials in the hauling, the undesirability of making a too dry mix, the hold-up in rapid delivery and the inconvenience of small loads—these things are done away with in the new system, which is a product of the Barrymore Concrete Mixer Corp., Hunter-Dulin Building, San Francisco, Calif.

Under this system, the bunkers at a central loading plant are equipped with accurate measuring devices which measure the materials requisite for a 2- or 2½-yard load of certified concrete. Two 50-gallon tanks are filled with water, a load certificate is prepared by an inspector and the truck driven to the job. At the job the mixer is started and the material given a dry mix. Water is then admitted slowly and at the expiration of 2 to 3 minutes, a thorough and evenly mixed load of fresh

concrete is ready for delivery to the hopper.

The certification system of this company involves the use of a reputable testing laboratory or its agents to certify the quality of the concrete. In this way, every load delivered from that plant contains an authentically proportioned concrete which is composed of the materials specified by the architect, engineer or contractor. Each load has a ticket on which are stamped the various weights of every material used in the mix, with an original and two carbon copies; the original to be retained by the operating company, one copy for the contractor and the other is filed at the laboratory. This ticket shows the driver's number, the truck number, the time of leaving the bunker, the mix number and any other identification necessary to associate this load with a given specification. At the end of the day's work, the laboratory furnishes a detailed report covering all quantities of concrete delivered during that day. This report will give detailed information regarding the quantities of material delivered, approximate strength of the concrete and any other information requisite to a thorough knowledge of all materials put into that job.

**BARRYMORE
TRUCK MIXER
DELIVERING
BATCH
ON THE
JOB**



Since an important feature is the fact that any consistency or slump can be obtained, concrete can be delivered as dry as can be worked or as wet as practicable. This item in itself places in the hands of the architect, engineer and contractor a new means for economical operation on any job of any size. This system should appeal to the owner because of the fact that he has access at any time to records showing the quality of concrete delivered into his building. It will appeal to the architect because his specifications for concrete will be used in the building and he can obtain a copy of the record of concrete delivered at any time, which will result in the irregularities in present-day concrete practice being eliminated. The engineer has the assurance that concrete of a predetermined strength or proportion and with any required slump can be specified and obtained.

By using this system, it is claimed that the contractor is able to obtain concrete at a price which can compete with his present costs of operation. It is on record that due to the speed with which the mixer can deliver concrete, a day has been saved on each pour.

The Truck Mixer

All controls on the combined truck and concrete mixer are from the driver's seat. When ready to mix, water is admitted into the body from the water tanks by six special valves, controlled from the driver's seat. The accurate measurement is accomplished by a water gauge. The mixing blades

are arranged in a spiral formation upon a central shaft in such a way that the spiral moves toward the center of the load. Each blade tracks behind the other, cuts through the mass, and thereby lifts, drops and works the material as an individual blade. This action mixes a small section of the load as the shaft revolves at the same time that it moves the entire mass toward a central point. At this time, the mass piles to a certain extent, then flows back to its beginning to repeat the motion. As more water is admitted and the mass becomes more liquid, an obvious current is created within the mix from each end toward the center, thence along the top back to the beginning.

The individual action of the blades in the mix creates a figure eight movement in one small section of the load. The flukes of the blades overlap and their spreading action causes the particles of the material to go first one way and then the other as they move down half the length of the body. In this way, a very thorough integral mix of the ingredients is effected. At the same time, the mass is enabled to move as a whole, creating an additional combination at the center to be repeated on the next revolution. Through this motion, a very valuable puddling and kneading action is obtained and each particle of sand and rock gets a thorough coating of cement. It has been demonstrated that this mixer gives under proper supervision a comparatively higher strength concrete than any other form of mixing such as the usual drum and gravity methods.

A New Steel Bridging Now Available

Strength, Convenience, Neatness and Cheapness Are the Main Features

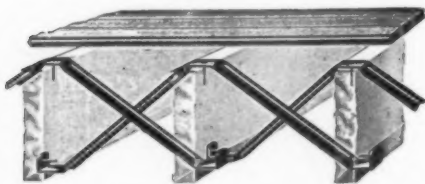
A STEEL bridging to be known under the trade name of "3-TY" has been developed by the Lane Brothers Co., Poughkeepsie, N. Y. It provides an integral connection between 3 joists, it braces by tension rather than compression and is stronger than the wood to which it is attached.

This new bridging, according to the manufacturers, eliminates all bother of preparation involved in the production of wooden bridging and all risk of misfit or faulty material. It will adjust itself automatically to variations in spacing of joists, is much more quickly applied than wooden bridging and presents a much neater and more workmanlike appearance when finished. It is shipped in straight lengths and applied on the job by laying a piece across the top of a joist and by pressing down the

two opposite ends under adjacent joists on either side, then nailing the central part to the top edge of the joist. The perforation for this nailing is countersunk, allowing the nail head to come down flush with the top surface. The floor is then laid before fastening the lower ends of the bridging, and afterwards these ends are bent around and nailed to the sides of the respective joists.

The diagonal arms are corrugated longitudinally for adding to their stiffness, while the end portions are left flat for the distance necessary for wrapping around the lower edge of the joists, and provided with a number of nail holes for nailing.

The same number of braces are used as there are joists, and 3 nails only, per joist, are driven, instead of the customary 8 each, in the case of wooden bridging. The manufacturers list 4 sizes that are said to cover some 14 different situations as to joist sizes and spacing. With each bundle of 48 full pieces, there are packed 4 halves for use at the ends of the runs or other special situations. In an emergency, this material may be cut with snips to any required length and bent as desired on the job with a hammer and nailing holes punched through it with an ordinary nail set, thus making any piece adaptable, with a little extra work, to any situation.



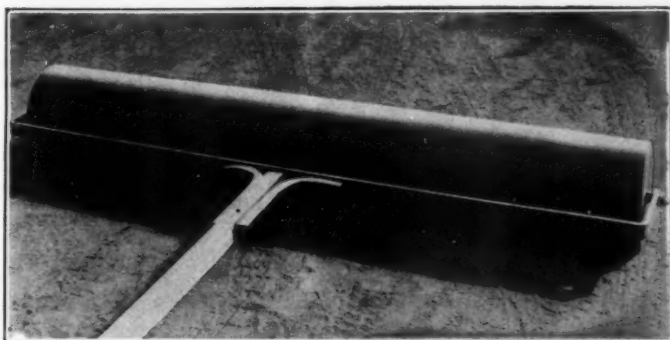
LANE 3-TY STEEL BRIDGING

A Concrete Roller for Finishing Roads

A Quick, Efficient Tool That May Be Operated By Unskilled Labor

A CONCRETE roller that may be purchased outright instead of leased annually, as formerly, is made by the Macon Concrete Roller Co., Macon, Ga. This roller is made in two different styles—one a continuous cylinder and the other divided. It eliminates the undulating, wavy effect often noticeable in concrete, leaving a smooth, even finish. By forcing excess water and air

often necessary to handle complex finishing equipment. It has no delicate mechanical parts to get out of order. According to the manufacturers, this roller has finished the greater percentage of concrete roadways now in existence and is contained in the standard specifications of practically every State. It has been approved by the Associated General Contractors of America and affiliated



**CONTINUOUS
CYLINDER TYPE
OF
MACON CONCRETE
ROLLER**



**SEVENTY
POUND CONCRETE
ROLLER
OF THE DIVIDED
TYPE**

pockets from the mixed mass of concrete, the strength of the pavement is increased. It forces the coarser content of the mixture beneath the surface, floating the finer particles to the top, forming a hard, compact surface.

The roller may be operated by common laborers instead of the more expensive skilled mechanics

organizations, as a standard tool, and its patent number 1,273,022 has been fully recognized by them. According to the manufacturers, over \$800 is saved during a season of 120 paving days by using this roller instead of the mechanical tamping method, and it produces a roadbed that is 20 per cent stronger than concrete finished in other ways.

Waukesha's New Eastern Offices

THE Waukesha Motor Co., Waukesha, Wis., manufacturers of heavy duty Ricardo head industrial and automotive gasoline engines, has opened its new eastern sales office at 8 West 40th St., New York. This office was formerly in the Aeolian Bldg., 33 West 42nd St., New York.

Hall Joins Duplex Sales Department

THE Duplex Truck Co., Lansing, Mich., has announced that C. W. Hall, formerly manager of the Lansing Distributing Branch of the Olds Motor Works and later with the Reo Motor Car Co., has joined its Sales Department, with headquarters at Lansing.

New Gasoline Truck and Crawler Crane

Rapid Transportation and Greater Lifting Capacities Available

FACILITY of operation, continuous and maximum service with the least amount of human effort are now available in gasoline cranes. A full revolving crane for ordinary hook block, clamshell bucket, drag-line, pile driving and magnet work has been developed by The Browning Crane Co., 16,226 Waterloo Road, Cleveland, Ohio. It is mounted on a heavy-duty motor truck chassis for rapid transportation, or on a crawler where greater lifting capacities are required.

The levers of these cranes are all in one bank and those levers which are used most are placed in such position as to require the least effort of the operator to manipulate. This convenient location of levers makes it unnecessary for the operator to leave his seat or to take his eyes off the load. Operating is further simplified, and greater speed is obtained, by patented differential brakes on both the hoist and holding line drums. The brakes are set at the start of the hoisting operation and are automatically applied when power is released. This eliminates one operation, as it is necessary to use

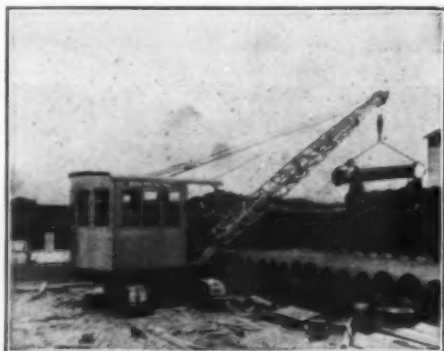


BROWNING TRUCK-MOUNTED CRANE WITH CLAMSHELL

only the clutch lever instead of both the clutch and bank lever.

All clutches are cam operated and interchangeable. Both the hoist and hold drums have tapered lagging, which spools the rope and prevents over lapping and adds materially to the life of both the cables and the drums. The rotating base is a one-piece casting which serves as a rigid mounting for all machinery. It assures perfect alignment of all bearings and shafts. The boom hoist mechanism is a positive power drive through a chain of gears, assuring safe, easy and rapid raising and lowering of the boom. The boom is of latticed construction, parabolic in shape, and is held in position by a patented brake and pawl.

The travel mechanism of the crane consists of double positive jaw clutches for each tread. To steer, one side is locked while the other side is in operation. Steering is accomplished from the cab of the crane and only one lever is employed, greatly facilitating the operation.



A BROWNING CRANE WITH CRAWLER TRACTION HANDLING PIPE

Texas Company Moves Philadelphia Office

THE Asphalt Sales Department of the Texas Co., 17 Battery Place, New York, has announced the removal of its Philadelphia office to 608 Franklin Trust Building. W. J. King is Asphalt Sales representative in Philadelphia.

Harkless Made Sales Engineer

THE Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago, Ill., has announced the appointment of M. J. Harkless as Sales Engineer of the Contractors' Department of the company. Mr. Harkless was previously an engineer of the Railway and Marine Supply Department of the Buda Co. at Harvey, Ill. He will make his headquarters now at the General Office of the Independent Pneumatic Tool Co. in Chicago.

The Genfire Steel Company

THE General Fireproofing Building Products, Youngstown, Ohio, has announced its change of name to the Genfire Steel Co. This change affects the name only and is made to avoid possible confusion with the General Fireproofing Co., also of Youngstown, Ohio, makers of steel office furniture and equipment. The officers, personnel, policy, products and everything connected with the General Fireproofing Building Products become a part of the Genfire Steel Co. Branch offices, warehouses, agents and dealers remain in the same except for the change of name. The Genfire Steel Co. will continue to manufacture fire-safe building products, which includes Herringbone, Key and Diamond Rib metal lath. Self-Sentering and Trussit, casement and basement windows.

Elevators for Sand and Gravel Delivery

Various Types and Sizes Enable the Contractor to Select the Right Apparatus for the Job

TYPICAL elevators of the centrifugal discharge, single and double strand vertical continuous, and inclined continuous types are manufactured by the Link-Belt Co., 300 West Pershing Road, Chicago, Ill., for handling sand, gravel and all abrasive or nonabrasive materials weighing about 100 pounds per cubic foot. They are made with or without steel or wood casings, according to the job and material.

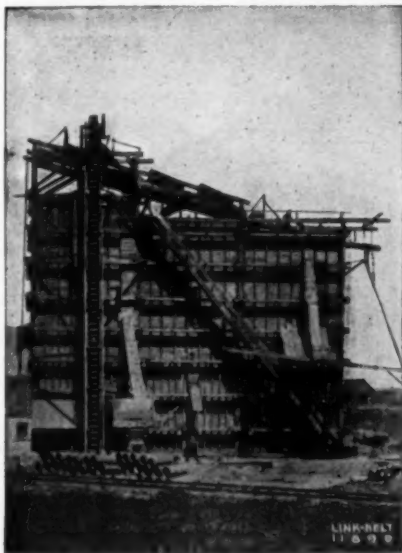
The centrifugal discharge type of elevator has malleable or steel buckets spaced at comparatively close intervals on sprocket chains. The buckets travel at certain definite speeds which will throw or discharge material from the buckets by centrifugal force in passing around the head sprocket. These speeds range from about 200 to 300 feet per minute, depending on the size of the head wheel.

The continuous bucket type has steel buckets spaced continuously, very close together on chains, or on rubber or canvas belts. The flanged front of each bucket forms a chute for the discharge from the succeeding bucket, thus effecting a clean discharge at slow speed. This slow speed, with the use of a feeding leg, permits feeding the material directly into the buckets, thus avoiding the wear and strain of digging through an accumulation of crushed stone, gravel, sand, or other material of a bulky or gritty character, in an elevator boot. The bucket speed is usually about 100 to



CONTINUOUS ELEVATOR DELIVERING SAND AND GRAVEL TO WASHING SCREENS

200 feet per minute. These elevators differ from the centrifugal discharge elevators in that the



CONTINUOUS BELT ELEVATOR DELIVERING SAND AND GRAVEL TO WASHING SCREENS



CONTINUOUS ELEVATOR DELIVERING SAND AND GRAVEL TO CONCRETE MIXER

speeds may be lower or slightly higher, as discharge is not dependent on the speeds.

Steel elevator casings are most generally used. They are made in standard lengths of 10 feet, with one special intermediate length, when required, to give necessary distance between head and foot sprockets. Each of the sections is provided with corner angles; and with flange angles for bolting them together, and attaching them to the head and foot section.

The head section casings require no additional supports to carry both head and countershafts. Their upper portion is made in 2 sections for

ready removal for inspection of machinery parts. A short discharge spout forms part of the head section.

Boot sections, 10 feet in length, are provided for insertion between the bottom intermediate section and the elevator boot. These have a removable end plate, and inspection doors on both sides, for easy access to the foot end of the elevator. For the centrifugal discharge type, the boot section is placed on top of the boot; but for continuous bucket elevators this section is provided with take-up bearings, hopper, loading leg, etc., and the bottom portion forms the boot itself.

An Odd Dredge for Battling the Gulf

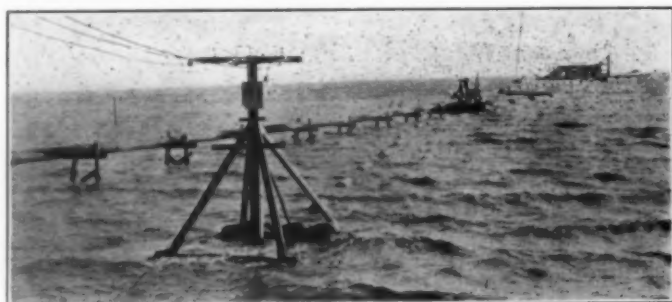
Complete Unit Used in Filling-in Back of a Retaining Wall 14 Miles Long

A HYDRAULIC pump dredge of very unusual construction was recently built by Jahncke Service, Inc., New Orleans, La., for the Woods Brothers Construction Co. of Lincoln, Neb. Located at Gulfport, Miss., on the Gulf of Mexico, it is now taking part in the great protective work of building a retaining sea wall 14 miles long, its particular duty being to fill-in back of the wall.

This dredge has been in operation for about 5 months. It is completely electrified, General Elec-

200 to 2,300 volts. This substation is mounted on trailers so that it may be transported by a tractor.

From the substation power is brought to the dredge through 2,800 feet of 3-conductor, submersible, dredge cable suspended from the tank-type pontoons. Potheads are located on the car, on the dredge and also on an intermediate platform between the shore and the dredge. Slip connectors are furnished with the potheads on the platform, so that, in case of any undue strain, the cable will



**DREDGE
WITH FLOATING
PIPE LINE
SHOWING
TRANSFORMER
STATION IN
FOREGROUND**

tric equipment being used throughout, and is one of the first complete installations of its kind. While seaworthy, it is of very shallow draft and carries a ladder with a rotary cutter, and it is spud rigged.

This equipment consists of a 15-inch Amsco centrifugal dredge pump driven by a 600-horsepower, 2,200-volt, slipring motor. The hoist motors, pump motors and ladder motor, varying from 10 to 75 horsepower, operate on 440 volts. A substation is located on the shore, transforming power from 13,-

part at this point.

A switchboard installed on the dredge controls the 2,300-volt line, a 75-kv-a oil engine-driven generator and a transformer bank. The transformer bank reduces the incoming voltage to 440 volts for the smaller motors and for lighting, fans, searchlight, floodlights, etc., through a lighting transformer. The 75-kv-a set is used for emergency purposes for operating the pump and hoist motors and all the lights in case power from the shore to the dredge fails.

Road Contractor—"Gawd, I wish I was in some other business where they didn't cut prices so."

His Wife—"Yes, and in two weeks you'd have that business where you've helped to put the road building business."

A New 6-Yard Tractor Truck

Rugged Construction and the Ability to Operate Under Difficult Conditions are Features

A HEAVY-DUTY tractor truck, built for the most severe rock excavation work serving steam shovels has been developed by the Lombard Tractor & Truck Corp., 342 Madison Avenue, New York. It has an especially rugged composite body of wood and steel construction which is standard equipment. The floor of the dump body is a $\frac{1}{4}$ -inch steel plate over a 2-inch hardwood floor. The cross bolsters are nine heavy 4-inch I beams and one 3-inch x 2-inch angle. The longitudinal sills are four angles 4 inches x 3 inches x $\frac{1}{2}$ -inch full length under the cross sills. The side sills and run boards are all steel, oak fitted. The rear posts are all steel, hickory fitted, and the side braces are twelve structural steel braces which support steel bound side posts with

unloading, and the load can be dumped and the body returned to normal in 1 minute.

The truck is equipped with a heavy-duty single-cylinder hydraulic hoist, and a 6-inch ground bore cylinder with $42\frac{1}{2}$ -inch piston travel. Its lifting capacity is 15 tons, and it has oversize cables, cross arms and base. The weight of the hoist is 700 pounds.

Each side of the lag belt crawlers has 31 lags 13 inches wide. The one-piece castings connected by chrome nickel heat-treated and hardened pins are of the highest grade manganese steel. The length of the road bearing on the lag belts on the level is 58 inches, and the total road bearing on the lags is 1,508 square inches. The light weight on the lags is 12.3 pounds per square inch of road

**A
LOMBARD
SPECIAL 88
TRACTOR WITH
DUMP BODY
HANDLING LARGE
ROCKS**



underbody braces. The top rail is covered with a $3\frac{1}{2}$ -inch x 3-inch x $\frac{3}{8}$ -inch steel angle. The tailgate is one way, folding under the platform. The body has a chain support, and a $3\frac{1}{2}$ -inch x $2\frac{1}{2}$ -inch x $\frac{1}{4}$ -inch steel angle supports the full width of the gate when hooked up level with the floor. The weight of the dump body is 4,800 pounds, including the side boards.

The length inside the dump body is 12 feet and the height is 6 feet. The height of the permanent sides is $18\frac{1}{2}$ inches. The side boards are 9 inches high. The width overall is $87\frac{3}{4}$ inches, and the height of the front is 30 inches. The capacity without the side boards is 4.11 cubic yards, and with the side boards is 6.11 cubic yards, on water level basis. An angle of 40 degrees insures quick

area, and with the 10-ton body the load weight is 25 pounds per square inch of road area.

This tractor truck is a 6-yard contractors' special, in 88- to 97-horsepower with a Climax R4U 4-cylinder 4-cycle type motor. It has a centrifugal type of governor—the normal setting of 1,000 r.p.m. can be increased by dash control up to 1,200 r.p.m. when required. The main tank and Stewart vacuum tank hold 60 gallons of gasoline, and the cooling system has a gear-driven centrifugal pump. It is equipped with heavy-duty dental-type fully-enclosed transmission, with 3 speeds forward and 1 in reverse. Ball or roller bearings are used throughout. Alemite pressure grease lubrication is used except in motor, transmission and rear-end drive.

Ingersoll-Rand Opens Branch Office in Newark, N. J.

A NNOUNCEMENT is made of the opening of a branch office of Ingersoll-Rand Co. at 236 High Street, Newark, N. J., in order to provide better sales and service facilities for

its customers in northern New Jersey and certain adjacent counties of New York State. F. K. Armstrong, formerly connected with the company's New York Sales Branch, will be manager.

Anti-Friction Belt Conveyor Idler and Rolls

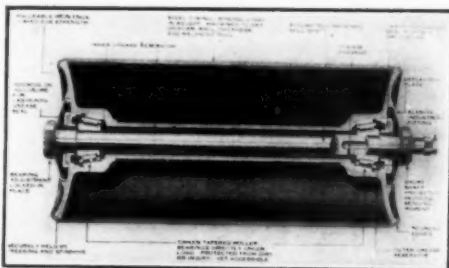
Advanced Type of Equipment Embodies New Features for Handling Construction Material

THE introduction of an anti-friction belt conveyor idler and return rolls of an advanced type of belt conveyor equipment for handling sand, gravel and other construction material has been announced by the Link-Belt Co., 910 South Michigan Avenue, Chicago, Ill. This equipment embodies many salient features of advantage in design which are the result of years of study and research, and is made at the Ewart Plant of this company at Indianapolis, Ind., in a building especially designed for its exclusive manufacture.

The outstanding feature of the idler is the absolute protection afforded by a labyrinth grease seal, mounted in a grease cap which also serves as an outboard reservoir and lubricates the bearing on the outside as well as on the inside, especially when the roll is on an incline. This, in turn, is protected by a deflector plate which deflects dirt, dust, grit or any foreign material away from the bearings and grease seal, and will not permit the washing of the grease away from the labyrinth.

The rolls are mounted on a self-cleaning "T" base. All rolls are interchangeable, being capable of serving in any of the three positions. The entire frame is riveted, and is without bolt or nut to work loose or to come out of adjustment. All bearings are Timken tapered roller bearing type, totally encased within the roll hub.

The close working tolerances to which all parts are built, which according to the manufacturers, are closer than have ever been attempted in belt

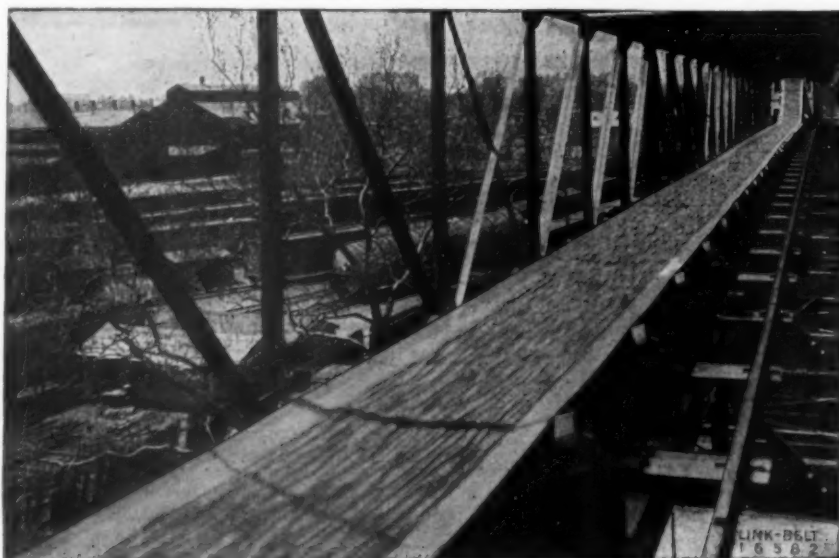


GENERAL DETAILS OF CONSTRUCTION OF LINK-BELT ANTI-FRICTION BELT CONVEYOR IDLER ROLL

conveyor history, is another advantage of this new equipment. The use of specially-constructed manufacturing tools assures alignment of bearings, and a well-balanced concentrically running roll.

Special care has been exercised in the machining of the roll shell in order to obtain uniformity of thickness of the wall into which the machine heads are pressed and securely held in place by spinning. The heads are dished for rigidity and strength, and the entire construction is such as results in maximum strength.

The design and construction of the roll make it practicable to vary the characteristics of the material used for the roll shell. A special iron has been developed for use in coke plants, that resists



A 30-INCH BELT CONVEYOR WITH LINK-BELT ANTI-FRICTION IDLERS HANDLING SAND AND GRAVEL

the corrosive action of sulphuric fumes and the abrasiveness of coke dust. The rolls have been granitized for handling certain types of material, such as salt, alkali and various other material that cause incrustation, pitting and rusting of ordinary steel or iron.

The idler rolls are supported in malleable iron brackets having a large bearing surface for supporting them, and they are not dependent on the use of slots. The brackets are so constructed as to support the ends of two adjacent rolls, thus ob-

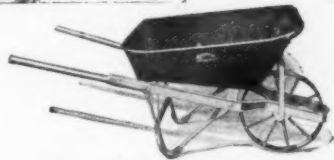
taining perfect alignment of rolls. Roll shafts are supported at both ends close to the rolls, without overhang, thus reducing the bending moment to a minimum. Rolls are spaced far enough apart to permit convenient removal from the frame by simply lifting them out without the use of any tools. Idler rolls are made in various standard lengths, and they are furnished in combinations to suit standard belt widths. The end stands are securely riveted to the "T" iron base, and are spread at the foot to present a rigid support for the idler.

An All-Steel Constructed Barrow

It is Light in Weight, Well Braced and Perfectly Balanced

THE Conco "Steelbilt" standard mortar and concrete barrow especially designed for contractors has been put on the market by H. D. Conkey & Co., Mendota, Ill. It is of all steel construction, light in weight, well braced and perfectly balanced. The tray sets level when the load is being wheeled to prevent material from slushing over the front.

The chassis is of channel steel, the legs and braces are of flat steel, and the pans are the regular standard pans as used on the wooden-type barrows. The frame is one piece from handle to handle, forming a dumping nose over the wheel and giving extra strong construction. The bar-



THE CONCO ALL-STEEL WHEEL BARROW

rows are built in four types; general purpose, contractors, mortar and concrete. Men on the job like these barrows because of their lightness and ease in handling.

A New 10-S Mixer

Simplicity of Design, One-Man Operation and Economy are the Features

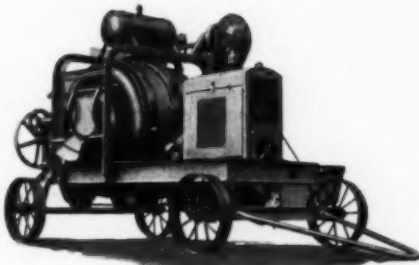
A NEW type 10-S mixer built entirely of steel, with die-pressed drum heads electrically welded to the steel plate center, has been developed by the Leach Co., Oshkosh, Wis. Leaking seams are eliminated and the heads are so shaped as to prevent slopping.

The trunnion rollers are placed wide apart, so as to hold the big drum steady. It operates with a minimum of noise, and is driven direct from the engine, connected by a fool-proof, enclosed clutch so that the drum can be disconnected while starting the engine. The winding drum and cable have been eliminated, the loader clutch on the overhead shaft being operated by an auto-truck type steel chain. The loader clutch is of the multiple-disc

type with an automatic knock out. It never fails to work at the right instant and the powerful brake gives positive control of the loader at all times. It remains locked in place at any point until released by pressure on the control lever. Should the operator let go of the lever, the loader bucket locks in whatever position it may be at the time whether loaded or empty.

The mixer is built for one-man operation with all levers bunched at the rear end, where both sides of the mixer can be watched at the same time. The discharge chute is operated by a geared mechanism which requires but little effort. The discharge opening in the drum and the chute itself are very large, making possible a quick cleaning out of the drum. A splash plate helps keep the mixer and workmen clean. The bottom of the skip is pitched at an angle of 58 degrees, which enables it to shoot the material into the drum quickly and cleanly, so that no pounding is necessary.

The new-design water tank with an improved type of 3-way valve measures the water accurately and can be removed from the tank for cleaning off scale, etc. The air valve is so designed as to prevent dripping. A patented overflow chamber catches the surplus water instead of allowing it to spray out and drip down over the mixer. The Alemite pressure system of lubrication is used throughout.



THE LEACH 10-S MIXER

Fuel Oil Salamanders for Winter Construction Work

Plenty of Heat and No Smoke Make New Equipment Desirable

OIL for fuel in the place of coke is gradually being used for heating materials, particularly on winter construction jobs. Salamanders burning this fuel have been developed by The Macleod Co., Cincinnati, Ohio. The special features of these salamanders are the oil burners of steel construction fitted with seamless drawn steel coils and their mounting in heating chambers of a size assuring the maximum amount of radiation.

The oil tank supplying the larger outfit is equipped with a pressure gauge, complete fittings and a hand pump suitable for pumping either air or oil into the tank. When required, the tank can be replenished with oil without stopping the burner and with no danger whatsoever. This salamander will displace 6 coke salamanders and can be carried around easily by 2 men. The tank is large enough to run the burner 24 hours, requiring charging but once a day.

The other salamander will answer all require-



A FUEL OIL SALAMANDER TO REPLACE SIX COKE SALAMANDERS

ments where short periods of heating are all that is necessary. It is a small, powerful unit, complete, and ready for operation.

A Portable Electric Saw for Building Contractors

A Time and Money Saver That Weighs Only 300 Pounds and Operates from Any Light Socket

AN electric saw table equipped with swinging arbor and tilting table that will perform all woodworking operations and may be picked up by handles and pushed as a wheelbarrow, has been produced by the Jones Superior Machine Co.,

1258-70 W. North Avenue, Chicago, Ill. Such operations as ripping, bevel ripping, straight cut off, mitering, dadoing, grooving, rabbetting, tenoning, etc., may be performed by the saw, and changing from one operation to another is a matter of a few seconds.

Equipped with a 10-inch combination saw which makes a very smooth cut, the changing of saws when changing from cross cutting to ripping is eliminated. The 10-inch saw protrudes through the table more than 3 inches and will cut off 3 inches x 6 inches, 2 inches x 10 inches, or 1 inch x 12 inches. It can be moved with either hand or foot.

The motor is rated at $\frac{1}{2}$ -horsepower but will pull a 200 per cent overload. It operates from any 110-volt electric light socket, either alternating or direct current. It is mounted at the bottom of the swinging yoke and is belted up to the saw arbor which is mounted on Timken roller bearings.

The frame is made of heavy steel, electrically welded into one solid piece, combining great strength and lightness in weight. The table, also made of steel, has been Parkerized, which makes it rust proof, and tilts sideways to 45 degrees.

The complete equipment of the saw consists of the following: $\frac{1}{2}$ -horsepower universal electric motor, ripping gauge, swivel cross-cut gauge, 10-inch combination saw, splitter guard which also acts as a handle to pull saw through work, belt, arbor wrench, switch and 10 feet of cord and a plug.



THE JONES SUPERIOR PORTABLE ELECTRIC SAW

Jonesville Gravel Co.,
Jonesville, Mich.



Gravel Plants by **TELSMITH**

Telsmith engineers know how to build gravel plants. Twenty years of experience have taught them to accurately determine the right size and type of machinery to fit the needs of your plant exactly. In the Telsmith factory they have complete facilities to build all equipment from crushers to bin gates—precisely to specifications.

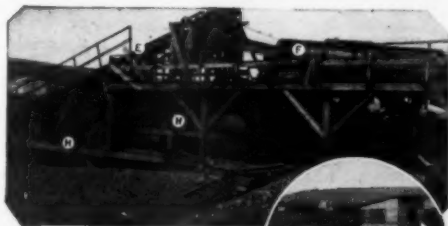
Telsmith Crushers (upper plate, E; lower plate, D) have the famous "parallel pinch" that starts crushing those large, smooth, hard gravel boulders right at the top of the bowl, eliminating the loss of efficiency due to slippage. Telsmith crushers stand up because both frame and crown are steel, the shaft is unbreakable, and all three are guaranteed against breakage, even by tramp iron.

Telsmith Plate Feeders (A—both plates) prevent overloading, increase daily tonnage and improve the product. Adjustable for any yardage.

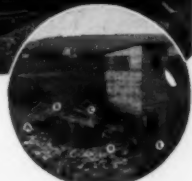
Telsmith Washing Screens (upper plate, C; lower plate, F) scrub, wash and size the gravel in a single cylinder with less water, less floor space, less headroom and less expense.

Telsmith Sand Tanks (upper plate, D; lower plate, H) actually are automatic; discharging 95% sand—thoroughly clean—and but 5% free water into the bins. No power or labor necessary and they work without being watched.

Telsmith Balanced Service plans your plant, builds and equips it with the right machinery, properly coordinated, to suit your pit and your needs. You deal with but one organization—thoroughly competent to take complete responsibility and financially able to make their guarantee of results iron-clad. Get the details, without cost or obligation. Write today for Bulletin G. P. 21.



Otisville Sand & Gravel Co.,
Middletown, N. Y.



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G.P. 10

Yes—we would like you to mention the CONTRACTORS AND ENGINEERS MONTHLY.

A New Oil-Burning Tar Heater

No Smoke and Regular Heat Are Features of New Design

A NEW oil-burning tar heater, which heats quickly and economically and is simple to operate, has been developed by the Joseph Honhorst Co., 1016 West 6th Street, Cincinnati, Ohio. This heater is of the torch type, burning kerosene and emitting a long streaming flame which can be regulated to control the temperature. Baffle plates distribute the hot gases evenly and force them into contact with all parts of the kettle. The fuel tank is of pressed steel with a hand pump, pressure gauge and hose connection. The manufacturers claim a distinct advantage in

the ease with which the burner can be removed from the heater and used independently for other purposes.

The kettle is half round, made of heavy steel with welded, leak-proof seams. Hot material is drawn off through a 2-inch valve in the rear. A strainer plate over this outlet prevents dirt from clogging the valve. A new feature is the perforated division plate inside the kettle, which keeps the cold lumps of material separate and allows the melted material to flow toward the draw off where the heat is more intense. The result is that the material flows from the kettle at a much higher temperature. The cover is attached with hinges and fits tightly, so that the material will not splash out when the heater is being moved. Steel wheels with plain bearings are standard equipment, but roller bearings and rubber tires can be furnished where desired. When rubber tires are furnished guards are provided to protect the tires from the heat.

The kettle is made in three sizes; 65, 110 and 165 gallons capacity.



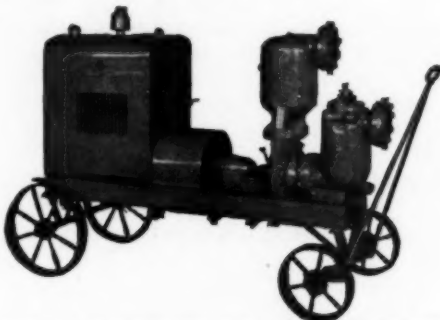
THE NEW HONHORST OIL-BURNING TAR HEATER

A Contractors' Self-Priming Pump

Serviceability Proven by Its Application in New York Subways

A CONTRACTORS' centrifugal, self-priming pump, built for stationary or portable service and with belt, motor or gasoline engine drive, has been developed by The LaBour Co., Chicago Heights, Ill. It is without diaphragms or valves of any kind and requires no foot valve. It also retains its prime even if air is admitted at the suction, and will handle dirty water. Its serviceability has been proven by its application in the construction of the New York subways where every conceivable pumping condition is encountered from the handling of raw sewage to the removal of subterranean water through well points. For sump or drainage service, it is advisable to provide a float operated switch to shut down the pump when not needed. As no foot valve is used, the pump may be placed wherever most accessible.

While local operating conditions cause some variation, in general this pump will prime itself and lift water from 20 feet below the pump. It will remove the air from a normal size suction line at the rate of about 1 lineal foot per second. The displacement of air is accomplished by trapping within the pump a small amount of liquid and by utilizing the velocity of expulsion of pockets of liquid discharged by the impeller. These entrain air which is carried out of the casing with the educting liquid. The air is then separated from the liquid, which is returned to the casing for reuse. The amount of liquid returned to the casing from the separator is controlled en-



THE LA BOUR PORTABLE GASOLINE ENGINE DRIVEN CONTRACTOR'S PUMP

tirely by hydraulic pressures within the pump and without the use of mechanism of any kind. The maximum rate of liquid return occurs at the time the pump is handling only air. There is no liquid returned when little or no air is being handled, and consequently, when acting as a liquid pump, there is no power or capacity loss due to recirculation.

The impeller is the only moving part of the pump. It operates in the casing with side and end clearances of at least 1-32 inch and without sealing rings or similar parts. It is light in weight and has a uniformly distributed load without end thrust. This makes possible the use of bearings

Ransome 14"x14" HIGH CARBON CHUTES

500,000 Horse Power Conowingo Project



Ransome Steel or Wooden Towers with 66-cu. ft. hoist bucket and 14-in. x 14-in. or 18-in. x 15-in. high carbon steel chutes have the same exclusive features as Ransome 36-S towers:

1. A tower that permits dumping of the bucket through the top panel.
2. A telescoping steel boom that permits changing the slope of the first section of chute

from 1 vertical to 2 horizontal to 1 to 3 or several intermediate pitches.

3. The tower that will carry a boom plant with a 48-ft. counterweight chute having its inner end tied down and carrying at its unsupported outer end, a 48-ft. swivel head chute.

Ransome built the first portable chuting plant eighteen years ago. Our Engineering Department is at your service.

RANSOME CONCRETE MACHINERY COMPANY

1850—SERVICE FOR 77 YEARS—1927

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NEW JERSEY

The New Ransome Chuting Plant

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on one side only and consequently only one stuffing box is needed. In order to protect fully against corrosion, the impeller blades are cast integral with a length of shaft sufficient to extend into the bearing housing where connection is made to the steel drive shaft. The suction opening in the casing is at the front and the discharge is double and from the periphery of the impeller. There is no volute or discharge chamber.

The pumps are made for direct connection through flexible coupling, or for belt drive. The drive shaft is supported by oversize ball bearings mounted in fully enclosed housings. There are no

bearings in contact with or adjacent to the liquid being pumped.

A double stuffing box is used which consists of two independent stuffing boxes separated by a lubricated packing gland. One stuffing box is of the conventional type, and is built into the pump casing. The other is entirely outside of the casing, and is flexibly mounted so that it is free to follow any shaft eccentricity. The entire stuffing box is enclosed, and all chance leakage is drained through the base plate and away from the pump. Effective means is also provided to prevent the liquid from entering the bearings.

New Adjustable Shore and Column Clamp

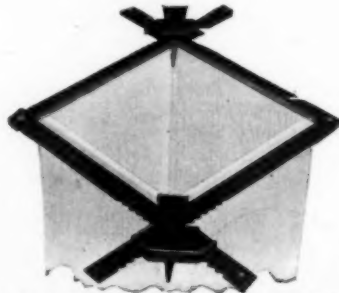
All-Metal Units Save Time and Money for Builders

TWO new products which are designed for high building efficiency and low labor costs have been produced by the Concrete Engineering Co., 1141 North 11th Street, Omaha, Neb. The all-metal shore is so constructed as to eliminate slip, has two positive adjustments and requires no wood members. The column clamp comes in two units already assembled and ready to be applied, with the 2-slot construction of the Meyer guide casting.

The Meyer adjustable shore is complete and ready to go in without additional expense for lumber and without extra time for assembling. Its construction is simple and sturdy and consists of a 1½-inch steel pipe with a screw jack base and a 2¼-inch steel tube with a welded angle head. The pipe slides into the tube and can be locked to within 2 inches of the required height by passing a bolt through holes provided for this purpose in the pipe and tube. This gives a quick approximate adjustment. The finer fractional adjustment is made with the convenient screw jack base, with handle.

A feature of the all-steel construction is that it saves lumber and time, and requires no wedging or blocking. Tedious, clumsy 4 x 4 splicing is eliminated, and there is no warped wood to be discarded. The two adjustments are positive and secure and shoring can be done in rapid order. In pulling down the centering, the screw jack will release the load gradually, protecting a green slab from possible cracks.

The shores are light in weight, but will support the heaviest loads and lift the load in case of settlement. The standard size gives an adjustment range from 8 feet 2½ inches minimum to 14 feet maximum. With the extension attachment the range is from 13½ feet minimum to 20 feet maximum. For heights less than 8 feet 2½ inches for ditches, tunnels, or wells, a type of head that will give a minimum adjustment of 6½ feet is available. No cross bracing is



THE MEYER ADJUSTABLE COLUMN CLAMP

necessary for heights up to 12 feet. Where bracing is required, a block arrangement can easily be attached. When the extension is used the bracing can be nailed to the angle head.

The Meyer adjustable column clamp combines the economy advantage of the all-metal clamp, and has a finer adjustment which is new to column clamps. It consists of 4 notched steel bars, 2 guide castings, and 2 wedges. Each pair of steel bars is hinged together with a bolt, and has 1 guide casting locked to the bar by a rivet. The 2 wedge slots give a wide range of adjustment and are quickly driven to the exact position which insures a leak-proof column form. The clamps are easily applied to either square or rectangular columns. Made of steel, they cannot slip or break, eliminating broken columns. They save lumber wastes, time in forming and stripping, and cost approximately half that of wooden clamps.

They are adjustable for columns from 6 inches to 25 inches, using 1-inch lumber. Holes are drilled in the hinge end of the bars to provide for the attachment of extension bars which are needed for columns larger than 25 inches and up to 48 inches.



THE MEYER ADJUSTABLE SHORE

BULL FROG WHEELBARROWS

THE BARROW THAT SET A NEW WORK STANDARD

This Bull Frog No. 64 Barrow showed the contractor how much material a man should move in a work-day. Perfectly balanced, with shaped handles, easy running, easy to dump, this barrow cuts labor cost and pleases the laborer. And it will stand a lot of punishment. The seamless, elevated tray of 15-gauge steel gives 4 cubic feet capacity dry, and 3 cubic feet wet. The reinforced angle-iron legs, the angle-iron nose guard, the patented Never-Break wheel, the strongly bolted frame of sound seasoned wood, mean long life under all conditions of use. If your jobber can't supply you, write us.

THE TOLEDO WHEELBARROW COMPANY
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There are Bull Frog barrows, carts, and scrapers for every construction purpose. Write for catalog.

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

New 4-Cylinder Tractor with Rubber Treads

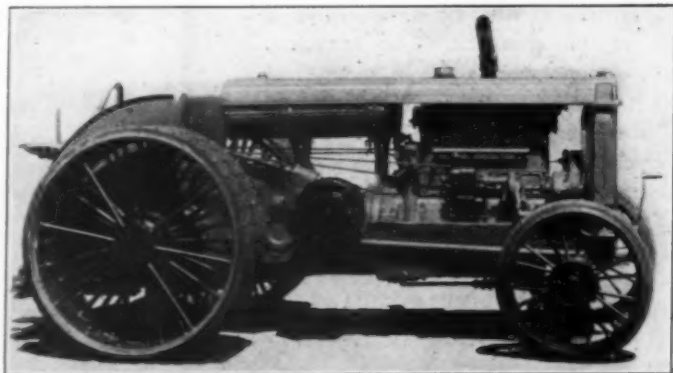
A Heavy Machine That Will Operate as Economically as a Smaller Tractor with a Power Capacity in Reserve

WHAT is said to be the heaviest wheel tractor yet equipped with rubber treads is now in production by The Huber Manufacturing Co., Marion, Ohio. It is a super-4 industrial tractor suitable for road building, road maintenance, freighting and general construction service where the work to be done and loads to be handled are of the heaviest and hardest kind. It is made in three sizes that deliver 22-, 30- and 40-horsepower respectively at the draw bar (S.A.E. rating). It is provided with low speed for heavy work and a high speed to make it suitable for long distance freighting service. The transmission is enclosed and run in oil, and it is equipped throughout with roller bearings. The power take-off and belt pulley equipment make it suitable for all classes of belt and draw bar work.

Every part of the tractor is built with a good margin of strength. From the front axle to the draw bar, the highest grade materials are used and

Full rubber tire equipment is optional on all three sizes of the super-4 tractors. French and Hecht expanding rim wheels with continuous rubber treads are used. With this wheel it is possible to mount or remove the rubber tread anywhere and at any time with the use of a hammer and ordinary wrench. The rear tires are 50 inches in diameter with 10-inch face and to this a 10-inch extension may be added to make a dual tread of 20-inch width. The steel tires on these wheels are 1 inch thick and the spokes are 1 inch in diameter. There are 48 spokes in a double tread wheel. The rubber tread has a thickness of about 3 inches.

In ordinary service no trouble is experienced in securing necessary traction with the rubber tread. This is due to the weight of the outfit, the broad tire face and the tendency of the rubber to cling to the road surface. When the going is wet and slippery an ordinary chain can be wrapped around



**HUBER
SUPER-FOUR
TRACTOR
WITH RUBBER
TIRES**

proportions are liberal beyond apparent needs. This over-size and over-strength construction is an insurance against breakdown and expensive repairs and delays. Transmission shafts and gears are made of heat-treated alloy steel cut from solid forgings and run in a bath of oil. The frameless construction insures strength and rigidity, which, according to the manufacturers, is not possible when parts are mounted separately on a built-up frame.

The broad, roomy deck close to the ground, the convenient controls and clear vision in all directions, short turning radius and quick response to the touch of the operator make this tractor as easy to handle as lighter tractors of much less power. The steering segment and worm are enclosed in grease and the front wheels are mounted on taper roller bearings.

the wheel. The front wheels are equipped with solid rubber tires 34 inches in diameter with a 5-inch face.

The rubber tread tractor gear ratio gives a low speed of from 1½ to 2 miles per hour for heavy pulling and a high speed of from 4½ to 5½ miles per hour for lighter work where speed is desirable. The engine speed can be varied instantly through a governor controlled from the deck. The front of the spring mounting and the cushion of rubber tires prevent damage to the tractor when running at the fast rate of speed. The engine is equipped with Eisemann high tension magneto with impulse starter, Ensign carburetor, Kingston all-enclosed governor, with deck control, Pomona oil filter air cleaner, and Perfex radiator core with cast iron housing. Alemite fittings for lubrication are used throughout.

*Building the Kai-
bab Trail into the
Grand Canyon
of the Colorado*



*One of the Two
WAUKESHA
Equipped Port-
able Ingersoll-
Rand Compress-
ors Used on this
Job*

N-731-M

Changing Nature's Face

Nature's brilliantly colored face as it is presented in the Grand Canyon of the Colorado now bears another line—the "Kaibab" trail. 3,350 feet in a distance of 4.6 miles this new and safe trail drops down to the Colorado River. Its unusually rapid construction during one Winter season was due largely to the use of reliable and simple gasoline engined portable air compressors.

Two crews, one at the top, the other at the bottom, each with a Waukesha engined 4½" x 4" portable Ingersoll-Rand Compressor did the job. The lower power unit was taken down piecemeal on burros and assembled at the foot of the trail. That the men who assembled and handled it, had no trouble is a wonderful demonstration not only of the "foot-proofness" of Waukesha "Ricardo Head" Engines and Ingersoll-Rand Compressors, but of the integrity of present day class of laboring men.

N-753-L

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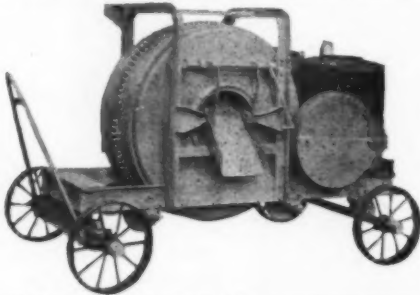
Exclusive Builders of Heavy Duty Gasoline Engines for Over Twenty Years

When writing to advertisers please mention the CONTRACTORS AND ENGINEERS MONTHLY—Thank You.

A Mixer for Plaster as Well as Cement

A Thorough Mix is Obtained and Time and Material are Saved

A MACHINE that mixes plaster with the same efficiency as concrete has been designed by The Standard Scale & Supply Corp., First Avenue, Pittsburgh, Pa. Several large New York contractors who have used these mixers say that they double the plaster production with half of the men ordinarily required, require less lime and



THE STANDARD PLASTER AND CONCRETE MIXER

gypsum, and give a much better plaster mix than the hand method. The plaster needs no troweling or retempering.

The success of mixing the plaster is due, according to the manufacturers, to the special narrow drum construction which combines minimum travel of the materials with a thorough, mixing action. An unusual point is the drum which is equipped with two steel roller bands instead of one cast band, thereby insuring smooth operation. The large gear operating the machine is carefully guarded and run in oil. Alemite pressure lubrication is used.

The drum as well as the truck is electrically welded throughout, which gives the mixer a stronger and more rigid construction.

Special attention was given in designing the power skip loader to eliminate all angles and sharp corners to permit a quick, clean discharge. When the skip loader is elevated, it is in a vertical position, eliminating the necessity of pounding the bottom.

A System for Handling Bulk Materials

Simplicity, Efficiency and Economy Combined in One-Man Operation

A SYSTEM for solving the ground storage problem and for stripping, loading, and reclaiming sand, gravel, stone and other bulk materials has been evolved by the R. H. Beaumont Co., Philadelphia, Pa. In it, machinery is reduced to its simplest form, consisting of a few rugged parts—scraper, double drum scraper winding machine, set of cables and fittings—and high capacity is attained.

A cable to which the scraper is attached is the connecting link between the scraper winding machine and the outer limit of the haul, allowing great flexibility of operation. One cable—the load cable—runs direct from the front drum of the scraper winding machine to the front bridle of the scraper; a second cable—the return cable—runs from the rear drum of the scraper winding machine out over the haul and thence over the necessary blocks back to the rear attachment of the scraper. By throwing a lever, the operator puts the pull on the front drum, placing the load cable in operation and the scraper at the digging point is pulled forward and the cutting edge digs; the material loosened fills the scraper.

When the scraper is loaded it floats on its load over the ground to the discharge point. By releasing the front drum and throwing a lever to engage the rear drum the return cable is put in operation returning the scraper for another load. The scraper is dragged back and forth and the material



SCRAPER HANDLING SAND



Fortify your roads! —now!

WINTER is near. Frost and snow are road-wreckers.

Strengthen your roads now—this Fall—with a Tarvia surface treatment.

There are no broken-up stretches in the Spring when this simple recipe is followed.

The *Barrett* Company

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THE BARRETT COMPANY, Limited
Montreal Toronto Winnipeg Vancouver

Tarvia

For Road Construction
Repair and Maintenance

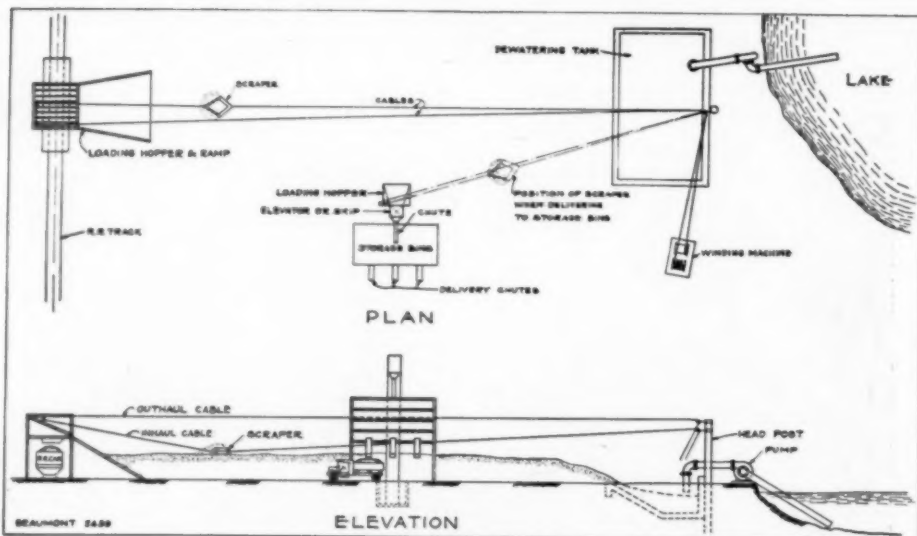
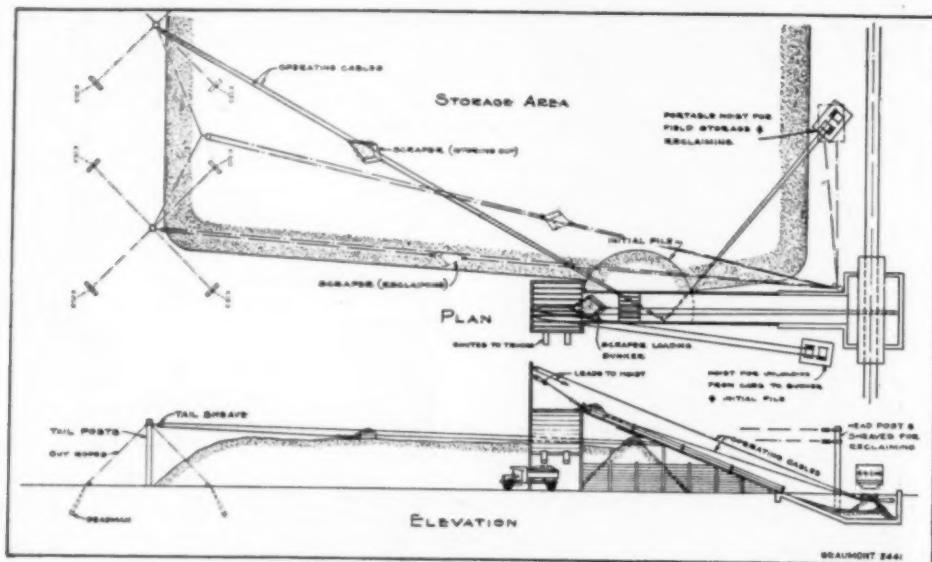


DIAGRAM SHOWING METHOD OF RECLAIMING SAND AND GRAVEL FROM A DEWATERING SUMP

can be brought from any desired place on the haul to the discharge point.

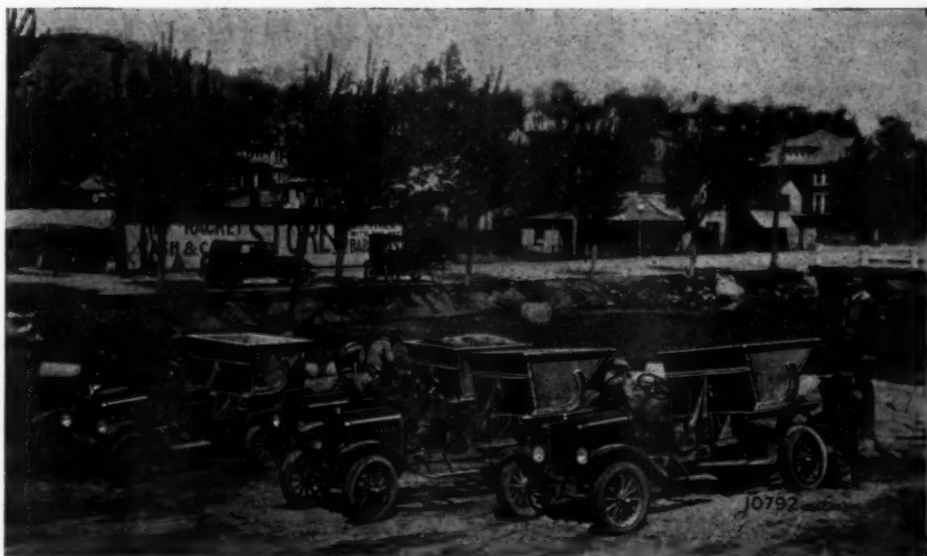
For working sand and gravel deposits, operators are able to handle many cubic yards of material per day at low cost. Any reasonable capacity can

be met by this system and there is a size to meet the requirements of the small plant that is handling 100 cubic yards per day as well as a size to suit the large plant that is handling 2000 cubic yards per day.



UNLOADING FROM CARS DIRECT TO TRUCK LOADING HOPPER OR STORAGE AS DESIRED
This system can be applied to all bulk materials

EASTON ROLLOVER BODIES



Easton bodies are designed and constructed for speed and durability. Their automatic operating methods and 60-degree dumping angle make hauling easier and insure positive discharge of material handled:—wet mix, sticky mucky material, sand, gravel, crushed stone, clay, etc., can be handled more expeditiously with Easton Rollovers. Write for bulletin No. 38.

Made in sizes of 1 yard and up

Ford sizes 1 or 1- $\frac{1}{4}$ yards.....\$90.00

EASTON CAR & CONSTRUCTION CO.

EASTON,

Offices and Works

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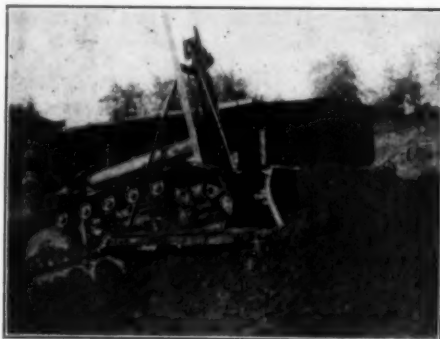
A One-Man Hydraulic Bulldozer

No Effort is Necessary for a Fine Adjustment of the Blade

A ONE-MAN BULLDOZER, made especially for use on the Fordson Tractor equipped with Model D Full Crawler, has been produced and placed on the market by the W. M. Blair Manufacturing Co., 3673 Michigan Avenue, Chicago, Ill.

The new Bulldozer is equipped with a blade made of $\frac{3}{8}$ -inch boiler plate and measuring 84-inches by 30 inches. The cutting edge is of high carbon steel. The adjustment of the blade in an up and down direction is actuated by the hydraulic pump controlled through a small hand lever by the driver of the tractor, thus making for a one-man proposition.

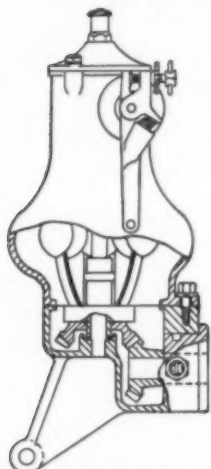
The machine is unusually well built and made strong enough to stand up under the gruelling work of bulldozing.



THE BLAIR BULLDOZER IN ACTION

A New Governor Attachment for Tractors

Steady, Smooth, Uniform and Cheaper Power Available



THE NEW PICKERING GOVERNOR FOR TWIN-CITY TRACTORS

A NEW model governor for the 17-28 "Twin City" tractor of the Minneapolis Steel & Machinery Co., Minneapolis, Minn., has been made available by The Pickering Governor Co., Portland, Conn. The governor can be easily and quickly installed by the operator of the tractor without the services of an expert mechanic.

According to the manufacturers of the governor, the tractor delivers better power—smooth, steady and uniform—when equipped with this governor. It delivers cheaper power and the tractor will last much longer, for engine racing is entirely eliminated.

Like all Pickering governors, this model for the "Twin City" is equipped with a built-in speed changer which is a simple device for increasing or decreasing motor speed, even while running. The governor is furnished as a complete unit, is a gear-driven outfit, fully housed for protection against dust, which first impedes responsive action and subsequently leads to premature wear of the moving parts. This company also makes governors for McCormick-Deering, Fordson, and other tractors.

A New Tractor Crane for Contractors

Speed, Safety, Mobility, and Low Maintenance Cost are Features

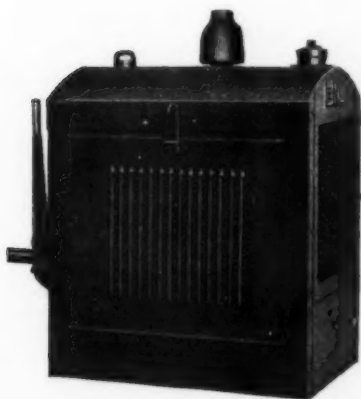
FOR trucking contractors, excavating contractors, general contractors, road builders, sand and gravel dealers, and many others, the "Tractocrane" has been designed by the Vergan Schmidt Co., Champaign, Ill. It is a crane of all-round utility, mounted on a Fordson or McCormick-Deering tractor, so constructed that it withstands the severe strains which material handling machinery is subjected to in the field. It is built

to give continuous service with the minimum of expense for repairs or shut-downs.

The manufacturers describe the scope of this Tractocrane as endless, including in the operations of which it is capable: excavating for building foundations and pits; laying pipe in trenches and backfilling over pipe; dragline bucket work; dipper shovel work; lifting magnet work; pile driving; drilling holes and setting poles; handling



*For Dependable
Power!*



A GAIN Le Roi gives the field an unprecedented value—a new 2 cylinder engine rated at 6 H. P. One that will more than satisfactorily perform within this power scope.

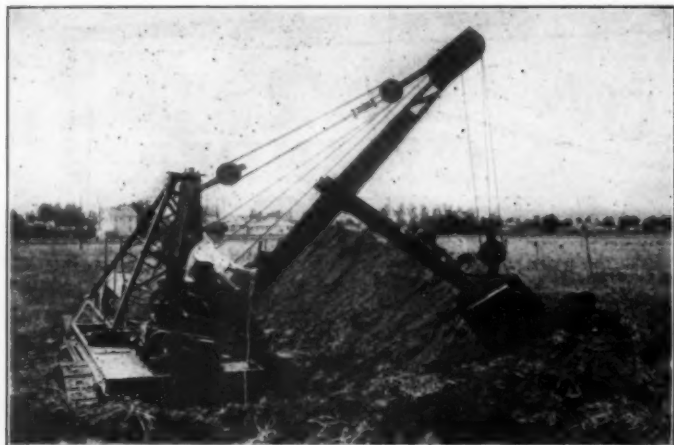
And think of it—working parts are interchangeable with other Le Roi models. Just a junior member of the Le Roi family imbued with all the “dependable” advantages.

Naturally, the price is down within the bounds of this class.

Le Roi Company *Milwaukee*

LE ROI ENGINES
3 to 160 HORSE POWER

Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.



THE
NEW VERGAN-SCHMIDT
TRACTOCRANE

lumber; unloading cars of pipe, sand, stone, coal, etc., loading trucks and railroad cars with coal, gravel, cinders, sand, etc., and switching railroad cars.

The location of the operator's seat and position of the lever make it possible for an inexperienced operator to become proficient in a short time—thus quickly putting the machine on an earning basis. The operator always faces the load handled as he rides with the boom.

Standard equipment of the Tractocrane is; rubber tire wheel mounting, clamshell bucket or fall block and swivel hook, friction clutch controlled worm gear boom hoist, ratchet friction drum for opening and closing the line, automatic drum for bucket hold line, and friction clutch swinging mechanism.

Special equipment consists of crawler mounting, special boom to suit work, two hand-controlled

friction drums, backfilling scraper scoop, drag scraper bucket, excavator pull scoop, dipper shovel and boom, lifting magnet equipment, pile driving equipment, telescoping outriggers with jacks, and guy line equipment.

The engine speed is 1,000 r.p.m., and the hoist line speed is 125 feet per minute. The hook speed is 60 feet per minute with a 2-part line, and 40 feet per minute with a 3-part line. The swing speed is 4 times per minute; the boom swing is a full half circle. The nominal capacity, with the Fordson tractor is 2,000 pounds at a radius of 15 feet, or 2,500 pounds with the McCormick-Deering tractor. The nominal capacity with outriggers, with the Fordson, is 7,000 pounds at an 8-foot radius, and 8,000 pounds with the McCormick-Deering. The bucket capacity is $1\frac{1}{3}$ -cubic-yard with the Fordson, and $\frac{1}{2}$ - or $1\frac{1}{3}$ -cubic-yard with the McCormick-Deering.

Brownhoist and Industrial Works Merge

DIRECTORS of the Brown Hoisting Machinery Co., Cleveland, Ohio, and Industrial Works, Bay City, Mich., have approved plans for the merger of the two companies, to be made effective when ratified by the respective stockholders at meetings which will be held in the near future. The businesses to be joined both occupy outstanding positions in the material handling industry. The object of consolidation is to render better service to users of material handling equipment by means of eliminating duplication or overlapping of products that exist, by effecting economies in manufacturing and by concentrating in each plant that portion of the work which can be produced to the best advantage.

The Brown Hoisting Machinery Co. was founded in 1880 by Alexander E. Brown. This company designs and manufactures hoisting and conveying appliances and heavy handling machinery of all descriptions, including locomotive cranes, grab buckets, combination shovels and

cranes, ore unloaders, bridge cranes, gantry and portal cranes, trolleys, hand traveling cranes and conveyor equipment. The principle plant of the company occupies $9\frac{1}{2}$ acres fronting on St. Clair Avenue, Cleveland, Ohio, and is served by switch tracks on the New York Central and Pennsylvania Railroads. This company also owns a modern and completely equipped iron and bronze foundry on 25 acres of land at Elyria, Ohio, 20 miles from Cleveland.

Industrial Works was founded in 1873 by George C. Kimball, James Clements, E. Wells and Charles R. Wells. W. L. Clements of Bay City was President from 1891 until his retirement in 1924, since which time E. B. Perry was President until his death on August 7, 1927. This company designs and builds locomotive cranes, wrecking cranes, heavy duty and full revolving pile drivers, crawler cranes and shovels for gasoline, steam, electric or diesel operation, gantries, pillar cranes, rail saws, buckets and steam hammers.

FROM SKIPGUARD TO BOOM TIP



More Paver—More Yards—More Seasons—More Profits

Heat-Treated Blades, Buckets, Chute defeat the abrasive wear of mixing—and preserve Rex speed throughout the season.

7-Second Water stops mixing penalties and water hold-ups—and it's accurate to the pound.

8-Second Discharge provides original Rex high-speed action in the Rex 70 second cycle.

Unified Action can add 40 minutes to the paving day by handling charging and discharging at one time.

Governor Booster speeds up the engine and the drum when the skip starts up—charging and discharging are faster.

THE average paving season has but 100 working days. In those 100 days, you must pour enough concrete to pay off a lot of equipment—and earn a profit. That demand calls for a paver that can do two things:

1. **Pour More Yards Per Day—**
for a lower cost per yard.
2. **Live through more seasons—**
for a lower cost per year.

On those two points, you'll be interested in the *New and Even Greater Rex 27-E*. It's built on the idea that a paver is real machinery—it's built for new speed and new strength. Ask us to show it to you—and prove that here is *The Finest, Fastest Paver ever Built*—from your own point of view. *The 1927 Paver Catalogue* is easy to read, and tells the details—send for your copy today.

Timken Bearings in the speed reduction, drum rollers and other bearings reduce friction and upkeep.

6-Cylinder Engine smothers the vibration common to many mixers—or you can get the Waukesha 4-cylinder job.

Unit Power Plant incorporates engine and speed reduction into one compact high-speed unit.

Foldback Top goes up or down in double quick time—it's power operated.

Bronze-Mounted Levers are an example of the many refinements added to simplify operation and maintenance.

REX PAVERS

(Reg. U. S. Pat. Off.)

When writing to advertisers please mention the CONTRACTORS AND ENGINEERS MONTHLY—Thank You.

A Crane for Light Trucks

Machine May Easily be Detached and Used as a Yard Derrick

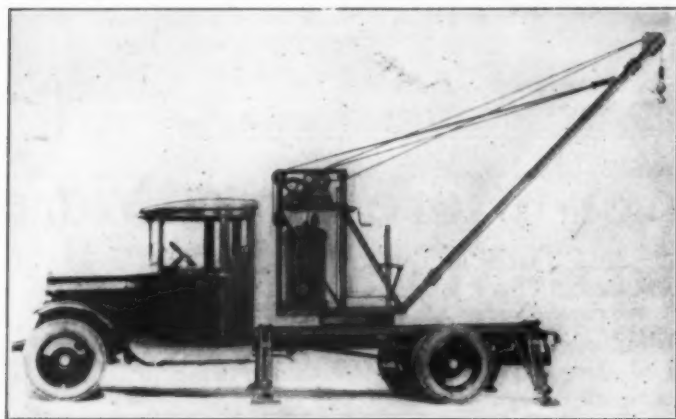
A TRUCK crane for mounting on comparatively light trucks, designed to meet the requirements of the average contractor who has use for truck crane equipment to lower his handling costs yet who must, on account of limited turn-over, limit his investment to reasonably priced equipment, has been brought out recently by the Squier-Rix Co., 373 Broadway, Milwaukee, Wis.

The truck crane is of substantial construction consistent with capacity requirements and is de-

motor, and the boom hoist is a hand operated worm geared safety winch.

A special feature of the crane, which makes possible the use of comparatively light trucks, is the use of four adjustable jack outriggers which are fastened to the hoist frame and not only insure stability on swinging loads, but also relieve the truck frame of strains and stresses. The hoisting speed of the hook is $32\frac{1}{2}$ feet per minute. The swinging speed can be varied.

A sheet metal cab is built over the transmission



THE
NEW SQUIER-
RIX TRUCK
CRANE

signed to fit the truck without the necessity of drilling holes or in any way altering the mechanical construction of the truck. The hoisting power is a 4-cylinder governor controlled engine with high tension magneto. It has a belt drive from the engine to the hoisting mechanism. This latter is the standard Rix transmission with 8-inch by 8-inch drum and 100-foot cable capacity. It has a double clutch drive with single lever control. It is equipped with an automatic load brake.

The swing of the boom is by power controlled by one lever. The power is taken from the hoist

and motor frame with canvas on sides. The standard boom is 15 feet, with a swinging radius of 360 degrees. Extra sections of 5 feet can be added. The crane can easily be detached from the truck and used as a yard derrick. It will mount on medium weight trucks and this permits the user to limit his cost in the truck as well as in the crane investment. It can be used for all of the material handling operations for which truck cranes are commonly used and on account of the ease of detaching from the truck it also serves as a yard derrick.

Blaw-Knox Purchases Milliken Bros.

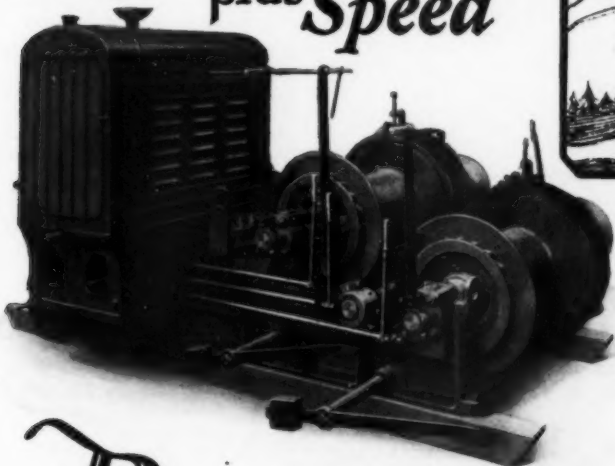
THE Blaw-Knox Co., Pittsburgh, Pa., has announced the purchase of the Milliken Brothers Manufacturing Co., New York City. The consolidation of the two companies became effective on September 1. The Blaw-Knox Co. is well-known through its line of steel specialties, including steel forms for concrete construction, steel buildings, open hearth furnace equipment, air preheaters, hammer welded products, steel transmission towers, automatic concrete measuring devices, steel bins, clamshell buckets, etc.

The Milliken Brothers Manufacturing Co. was originally organized as Milliken Brothers, Inc., in 1857. The products of the company are trans-

mission towers, radio towers and standard steel buildings. A considerable amount of the business of the Milliken Brothers Manufacturing Co. has been in the export field and the present Milliken organization will continue to function in this field and, in addition, will take over the management of the export business of the Blaw-Knox Co.

The Blaw-Knox Co. announces that it will continue with its present organization to handle domestic business and the acquisition of the Milliken Co. will make no change in this line. Manufacturing for both companies will be concentrated at the Blaw-Knox Co. plants at Pittsburgh and Baltimore.

Power *plus* Speed



Both at your instant command

TRADE MARK
MUNDY
ESTABLISHED 1869

To Equipment Distributors

The New Patent Three-Speed Hoist is fully protected by patents in the United States and Canada.

Some open exclusive sales territory is now available.

THE swift-running deer depends upon *speed*, and ability to outdistance its pursuers. Nature gave it speed for that purpose. The elephant . . . ponderous and slow-moving . . . finds his defense in tremendous strength. The old-fashioned hoist was an "elephant" . . . powerful but slow. Efficiency nowadays depends just as much on speed. When there are heavy jobs to be done, the Mundy Three-Speed Hoist has the power of a mammoth. When it's speed that's wanted it has plenty of that too.

In your hoist equipment, power, of course, is essential. But power alone is not enough. To attain greatest efficiency your hoist must also have speed.

The Mundy Three-Speed Hoist has *both* power and speed. All you'll ever need to handle any load. Nature could not have done better . . . because in this one unit we have combined the power of the elephant with the speed of the deer.

Actually, the Mundy Hoist is a three-in-one machine. Three ordinary hoists, each with

a different speed and line pull would equal one Mundy.

Which would you rather have . . . three hoists . . . or one Mundy, in which is incorporated three separate and distinct speeds; any one of which may be instantly called upon by the mere shifting of a lever?

The Mundy Hoist has power for the heavy loads . . . speed for the lighter ones . . . INSTANTLY . . . without the old-time nuisance of reaving changes. Let us tell you the full details.

The Mundy Sales Corporation

Distributors for the J. S. Mundy Hoisting Engine Co.

30 Church St., New York

Agents in Principal Cities

MUNDY HOISTS

The Hoist With The Asbestall Frictions

Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

Slackline Cableway in Double Duty on Reservoir Job

First Makes Excavation, Then Places Concrete

IN the construction of a concrete water reservoir on the shore of Lake Michigan for the City of Kenosha, a decided saving of labor was effected by a slackline cableway serving first as an excavator and later as a conveyor of wet concrete. O'Dea & Shafer of Madison, Wis., were the general contractors and a "Junior" Sauerman cableway made by Sauerman Bros., Inc., Chicago, Ill., was used.

It was necessary, in preparing the ground for the construction of the reservoir, to make an excavation 180 by 180 feet in area and 11 feet in depth in the water-bearing sand of the lake shore. Most of this excavation was handled by the little cableway, which was an ordinary $\frac{1}{2}$ -cubic-yard gasoline-operated outfit with the operating span lengthened to 400 feet. On account of the shallowness of the digging, a movable tower was used at the head end. This tower made it possible to shift the line of travel of the bucket very rapidly and complete the excavation in a minimum number of days. It also facilitated piling the excavated material in a limited space between the tower and the reservoir site.

Then, when the forms were in place and the

time came to pour the concrete, the excavator was converted into a conveying cableway that carried tilting buckets filled with concrete from the mixer out to the pouring crew. The conversion of the machine was accomplished simply by taking off the bucket, attaching the load cable to the carrier and suspending a hook by a chain from the bottom of the carrier. The scheme required two concrete buckets, so that there would always be one bucket at the discharge spout of the mixer. The head-tower of the cableway was lined up with the mixer and the bridle-frame on the opposite bank of the excavation moved along to correspond. This brought the track cable directly over the mixer and the conveying of the concrete out to the forms became simply a matter of lowering the track cable until the carrier rested alongside the mixer, hooking the chain into the handle of the loaded concrete bucket, raising the track cable until the bucket was clear of the ground by winding in the tension cable on the rear drum of the cableway power unit, and then releasing the brake on the front drum controlling the load cable so as to allow the carrier and bucket to coast down the track cable to the point where the concrete was to be



WHEN
THE SLACK-
LINE
CABLEWAY
SHOWN IN
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THIS
RESERVOIR
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IT WAS
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CONVERTED
INTO A
CONVEYING
CABLEWAY
FOR PLACING
CONCRETE

Saved by an "Operation"

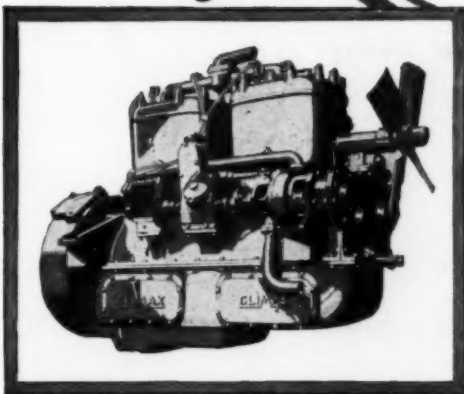
How One Manufacturer

saved a customer's good will by taking out another make of Engine and putting in its place—

CLIMAX

The "Trustworthy Engine"

Trade
Mark
Reg.
U. S.
Pat.
Off.



THE MOLAND-DRYSDALE CORPORATION Face Brick Manufacturers

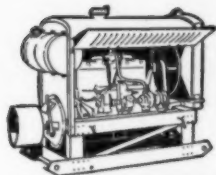
Hendersonville, N. C. July 12, 1927.
Climax Engineering Co., Clinton, Iowa.
Gentlemen:—We operate two... locomotives, a seven ton and a twelve ton... locomotive, which was the first one we purchased, contained a Climax Engine and it proved highly satisfactory in every respect. When we purchased our twelve ton... we expected to find the engine in the seven ton locomotive was capable of doing seven ton work of fact, the engine in the seven ton locomotive wasn't satisfactory. As a matter of fact, the engine in the seven ton locomotive was capable of doing seven ton work. But then we were discouraged. Climax engine. It was an engine that the engine had proved then removed of another Climax Engine. From that time our troubles ceased and we have been delighted with the performance of the engine. It has been completely satisfactory in every respect and has done everything that it has been assigned to do—and then some. That is what we can say for a Climax Engine.
Very truly yours,
THE MOLAND-DRYSDALE CORPORATION,
(Signed) Bruce Drysdale,
General Manager.

Remember Performance Depends on Power

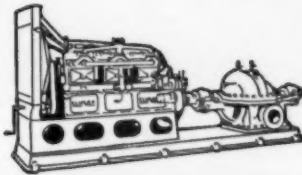
Write for list of Manufacturers who have adopted Climax as Standard Equipment.

CLIMAX ENGINEERING CO.
Clinton, Iowa

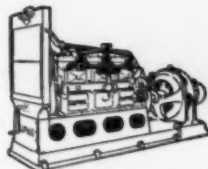
New York Chicago Cleveland
COAST MACHINERY CORPORATION
San Francisco Los Angeles



One of the Climax Portable Power Units

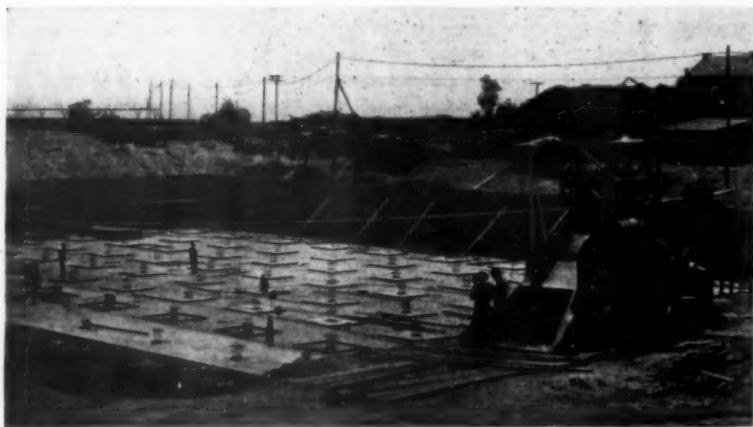


Climax Centrifugal Pumping Unit



Climax Electric Generating Unit

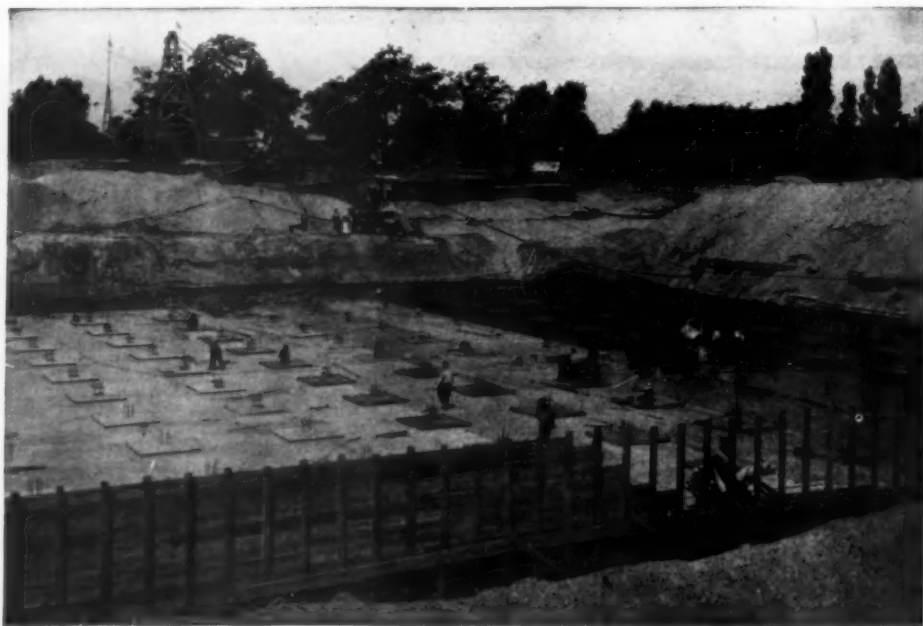
Please mention the CONTRACTORS AND ENGINEERS MONTHLY—it helps.



READY
TO TAKE A
LOADED
CONCRETE
BUCKET
AWAY
FROM THE
MIXER

discharged. There a man tilted the bucket to pour the concrete into the forms, after which the empty bucket was pulled up the inclined track cable, again lowered to the ground beside the mixer, and the chain transferred to the handle of the other bucket. This bucket had received a batch of concrete from the mixer while the first bucket was making its trip out to the forms and back.

As the cableway spanned the reservoir and could be moved along in unison with the mixer, it was able to deliver the mixed concrete to all parts of the work. After the reservoir was completed the contractors expressed themselves as highly satisfied, from the standpoint of both speed and economy, with this unique method of placing the concrete.



THIS PHOTOGRAPH SHOWS HOW THE TILTING BUCKET SUSPENDED FROM THE CARRIER OF THE CABLEWAY POURED THE CONCRETE

All the finished concrete shown in the picture was placed in this manner

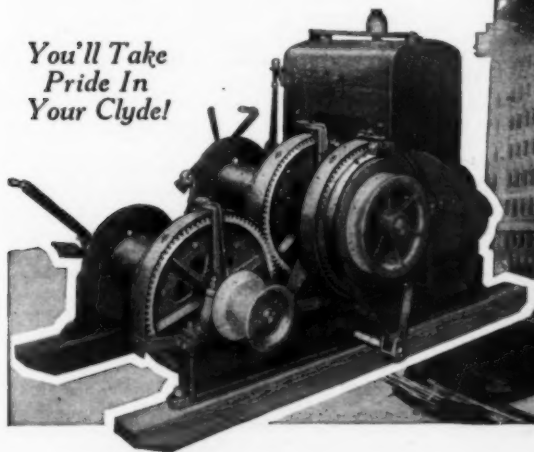
*It is pleasant to contemplate success but it takes enormous courage to achieve.
Remember, too, oftentimes, it's harder to stay on top than to get there.*

HOISTS CLYDE DERRICKS

The illustration shows the new Thomas Jefferson hotel under construction at Birmingham, Ala. Foster & Creighton Co. of Nashville, Tenn., were the general contractors. Two Clyde double drum gasoline hoists were used on the job to handle all materials.

Clyde gasoline hoisting equipment is gaining in popularity on building construction work everywhere. Your inquiry to the home office or any branch will bring you complete information about these units and their ability to increase your profits.

*You'll Take
Pride In
Your Clyde!*



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Sole Distributors for CLYDE IRON WORKS, Duluth, U. S. A.

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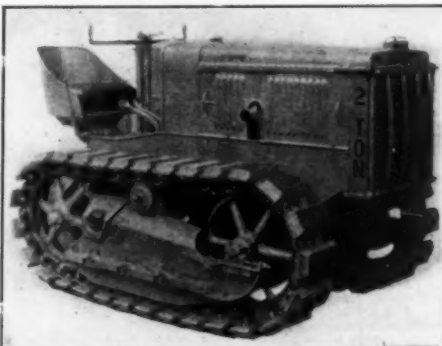
Rubber Tracks for Tractors

Development for Use in Industrial Plant and for Heavy Pulling on Finished Roads

RUBBER tracks for Caterpillar tractors have now passed the experimental stage and are being sold by the Caterpillar Tractor Co., Peoria, Ill., and San Leandro, Calif., for use in industrial plants and where finished road surfaces demand extremely light treading power. The rubber track as it is used on the 2-ton and Thirty models of Caterpillar tractors consists of a series of separate rubber pads approximately $1\frac{1}{2}$ inches thick belted to the track assembly.

The track has been tested for three years under most severe conditions and its life is said to be surprising until one considers the great length and width of the rubber surface which at all times is in contact with the ground. The rubber tread on a Caterpillar 2-ton tractor presents a ground contact of approximately 612 square inches, which contrasts with the very small surface of an automobile or motor truck tire which is in contact with the ground. With this great road surface in constant contact, there is very little slippage and consequently, the wear is slow. The tracks cushion

the road shock and thereby lengthen the life of the entire mechanism.



A CATERPILLAR 2-TON TRACTOR EQUIPPED WITH RUBBER TREADS

A Machine That Cuts Up Wire and Cuts Down Costs

Labor Saved Will Often Pay for the Cutter in One Day's Use

BEARING in mind that millions of pieces of wire are cut up each year to be used for tying concrete forms, Howard O. McMillan, President of the M & M Wire Clamp Co., Minneapolis, Minn., designed a cutter which would do this work rapidly and in an efficient manner. This cutter has just been placed on the market. The manufacturers say it is five times faster to cut up wires with this cutter than to use pliers or bolt cutters. The wire can be fed into the cutter blades without being fed through the cutter. A man uses only one hand in operating the cutter. Bolt cutters and pliers are often too slow when any quantity of wire is to be cut up, as bolt cut-

ters require two hands to operate and pliers are usually too small and light to handle heavy wire.

This cutter is held open to receive the wire by a simple spring action. It can be bolted to a bench and gauges can be set for cutting wires to specific lengths. It gives a straight and even cut so the wire will handle easily without scratching the operator's hands. It will cut wire or mild steel rods up to $\frac{1}{4}$ -inch.

The manual labor saved in this operation is an important feature. Two men can cut wire faster than one man, if the wire is to be in long lengths. One man can feed and cut the wire and the second man draw the wire through to the gauge for length and pile up the wires as they are cut. If the coil of wire is placed on a revolving spool, it will unwind and speed up the operation. The cutter is likewise used for cutting suspended ceiling hangers.

The blades can be easily removed and re-ground and the lower blade shimmed up. The cutter weighs $4\frac{3}{4}$ pounds. The castings are certified malleable castings. The cutting jaws are made of the best grade of tool steel available. The complete cutter is painted a bright red. The pins are made from shafting steel and, with a drop of oil occasionally, they will require no attention or repairs. If it becomes necessary to repair or replace the spring, ten or more springs can be made from an ordinary screen door spring.



THE M & M WIRE CUTTER

CURE *your* CONCRETE CURING TROUBLES

For Curing by the Integral Method

Solvay used integrally gives quick set and greater early strength—cures uniformly throughout the entire thickness of the concrete.

With Solvay Flake Calcium Chloride in the mix you accelerate the set to such an extent that under proper control the concrete will gain sufficient strength to withstand traffic in as *short a time as 4 days*. Even under ordinary conditions the time required is only seven days.

—or for Surface Curing

Where surface curing is desired, Solvay provides a remarkable advance over old-fashioned methods. Spread Solvay evenly over the surface as soon as the concrete is able to bear the weight of man. For this purpose the use of a Solvay Hand Spreader is recommended.

Solvay Flake Calcium Chloride is sold in 100-lb. moisture-proof bags and in drums of 375 lbs. net weight, from 75 conveniently located distributing centers.

Send for booklet No. 2056 "Curing Concrete Roads with Solvay Calcium Chloride"—and nearest stock point.

SOLVAY SALES CORPORATION

*Alkalies and Chemical Products
Manufactured by
The Solvay Process Company*

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Use



A New Line of Gasoline Engine Driven Air Compressors

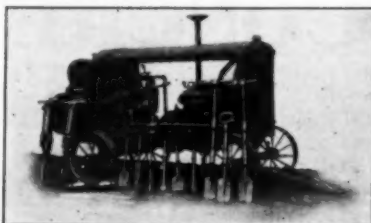
Machines Can be Supplied on Any Standard Mounting

A NEW line of portable gasoline engine driven air compressors that can be supplied on any standard mounting, has been added to the present line of pneumatic tools of The Denver Rock Drill Manufacturing Co., Denver, Colo. These compressors can be skid mounted, mounted either on steel or rubber tired wheels, or on trailers, and the small size is suitable for mounting on a Ford truck.

The three compressor sizes are 6-inch by 4½-inch, 8-inch by 6-inch, and 9½-inch by 6-inch bore and stroke, providing a selection suitable for the operation of a varying number of rock drills, concrete breakers, clay diggers, air hoists, sheeting drivers, etc.

The engine is of a standard make, designed for heavy duty. It is of the 4-cylinder "L"-head type, with force feed lubrication, and constructed for dependable long-lived operation. A high tension magneto with impulse starter insures easy starting. A dependable governor controls the engine speed within the maximum r.p.m. limits. The carburetor is simple and efficient.

The engine drives a single acting, duplex, vertical compressor, through a flexible, quickly detachable coupling. The compressor also is of reliable make, well water jacketed, with balanced crankshaft to minimize vibration. Suction and discharge



ONE OF THE NEW LINE OF DENVER AIR COMPRESSORS

valves are of the duo plate type, and operate with a low lift, insuring efficient operation.

The frame is a single piece steel casting, with air receiver and gasoline tank mounted on an extension to the rear. Ample cooling is effected by means of a large sectional radiator, which is protected by heavy steel rods. The unloading device is automatic and positive, and when the compressor is operating in the unloaded position, the engine is cut to idling speed by means of a carburetor throttle control mechanism. The engine and compressor being fully balanced, the unit is free from vibration.

New Road Rooter Built to Keep Pace with Modern Tractors

Will do the Work of a Rooter Plow Without a Plow Shaker



THE NEW CARR ROOTER PLOW

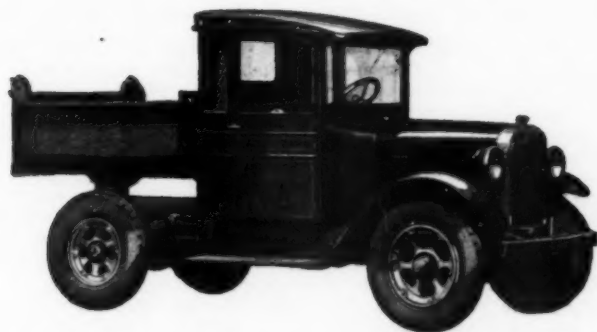
WITH the idea in mind of building a machine that will keep pace with the modern tractor, Ted Carr & Co., 939 West North Avenue, Chicago, Ill., has brought out a new Road Rooter that will carry one, two, three or four reversible rooters, to suit the capacity of the tractor. This machine will do the work of a rooter plow without a plow shaker, as the wheels have taken the place of plow handles.

In order to stand the speed of modern tractors, the manufacturers have mounted these wheels on Timken bearings. The rooters are held on by the old but reliable U-bolt clamp. These have been made modern by being provided with finished nuts to make easy the changing of the teeth.

New Plant for Aeroil Burner Company

THE Aeroil Burner Co. has announced the removal on June 1, from Union City, N. J., to a newer and more complete plant at Park Avenue, 13th and 14th Streets, West New York, N. J., where modern facilities and larger quarters will permit the company to manufacture in larger quantities and carry a more complete stock of Aeroil products for immediate shipment.

New ^{6 CYLINDER} **GRAHAM BROTHERS** *Two Ton Dump Truck*



Here is the 2-Ton Dump Truck that road builders, contractors and engineers have been seeking.

Power—smooth and plentiful—from the 6 cylinder engine.

Four speed transmission and selective gear ratios in the rear axle to apply the power without strain—for any pull, for any speed.

Four wheel brakes (Lockheed Hydraulic) to make the greatest possible use of speed with safety.

Chassis built for the unusual stresses of dump truck work. See it... Compare it with any other 2-Ton Dump Truck ever built.

GRAHAM BROTHERS

EVANSTON - DETROIT - STURGEON
A DIVISION OF DODGE BROTHERS, INC.
GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO

**With gear ratios
to fit your needs**

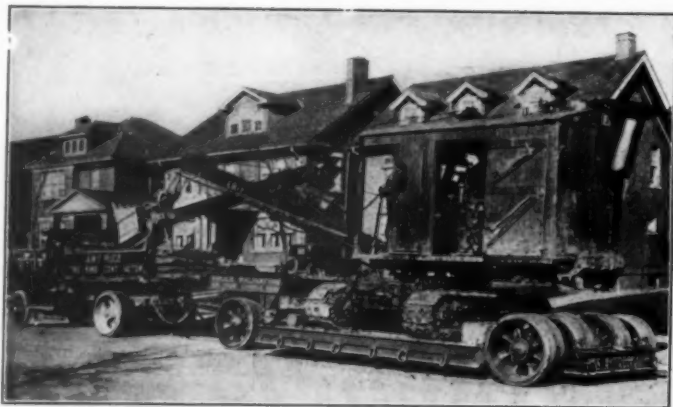
**~ and
the
price**

\$1645

(CHASSIS F. O. B. DETROIT)

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

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FRUEHAUF
TRAILER WITH
ITS FULL SIZE
LOAD OF
AN ERIE STEAM
SHOVEL
BEING HAULED
BY A MOTOR
TRUCK

A Heavy-Duty Carry-All Trailer

30- to 40-Ton Capacity Machine Designed Especially for Steam Shovels

A NEW heavy-duty carry-all trailer used for transporting steam shovels and similar equipment at motor truck speed rather than under their own power is the latest development of the Fruehauf Trailer Co., Detroit, Mich. Contractors, excavators, road builders and truckers are finding that the use of this trailer enables them to get their heavy-duty equipment from job to job rapidly without loss of time. The absence of repairs needed to equipment of this kind, due to running on long distances under its own power, makes possible large savings in new parts and prevents loss of time while these repairs are being made. In some localities where excavating contractors dig basements for small residences and are able to use their large shovels in doing these jobs, there are instances where as many as three of these basements have been dug in one day.

The lowest possible platform height is obtained in this particular type of carry-all, which was de-

signed particularly for steam shovels and the loading and unloading which is done from the side of the trailer. The four wheels in the rear are mounted on two axles of the trunnion type, which permits each wheel to adjust itself to any road contour, thus insuring full road contact on all wheels.

The front gear of this trailer is equipped with a roller bearing circle of the fifth-wheel variety, permitting the trailer to be steered easily without any strain on the towing truck regardless of the weight of the load on the trailer.

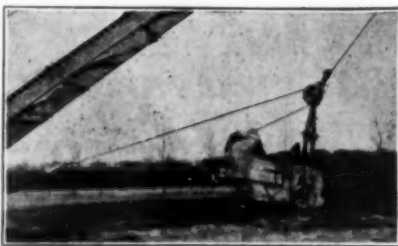
This carry-all, the Fruehauf type B, is available in standard capacities of 30, 35 and 40 tons. The carrying capacity is limited to the loading of rubber tires permitted under the average state law. Other types of trailers permitting wider widths of rubber tires, side loading carry-alls, etc., are being made by this company, in carrying capacities of from 6 to 90 tons.

A New Husky Dragline Bucket

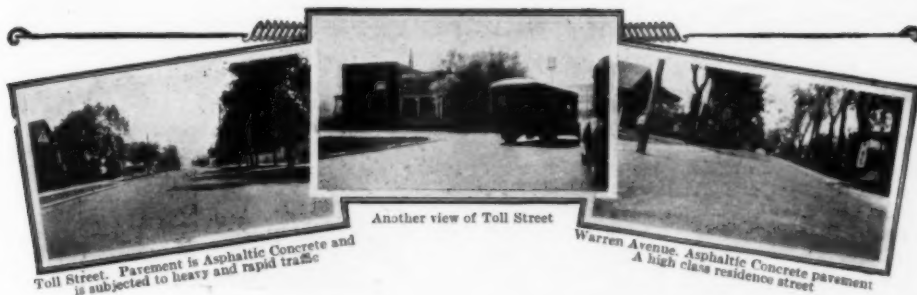
Increased Output and Greater Yardage Possible

THE 1¼-cubic-yard Blaw-Knox dragline bucket that attracted so much attention at the 1927 Good Roads Show in Chicago was purchased by the W. J. Newman Co. of Chicago and was put to work excavating prairie soil for the new zoo at Riverside, Ill. This large contractors' type dragline bucket is manufactured by the Blaw-Knox Co., 667 Farmers Bank Building, Pittsburgh, Pa. It is simple, and clean-cut in design. Hard alloy-steel lips, trunnion link bushings, and drag-chain connection bushings assure long life of its wearing parts. The dumping is clean and rapid—the headroom is kept to a minimum. Increased yardage results from many improvements in design and there is less dead weight without the corresponding

sacrifice of strength.



THE BLAW-KNOX DRAGLINE BUCKET



TOLL STREET and WARREN AVENUE, Hammond, Indiana, are heavily traveled. Traffic on Toll Street is heavier than any street in the city. Nearly every pleasure car, bus and truck moves northward out of Hammond along this route.

Stanolind PAVING ASPHALT

was used in building these two streets. They are of Asphaltic Concrete construction, laid in 1926 by the Ahlborn-Lavene Construction Company.

*—for long and satisfactory service, use
Stanolind Paving Asphalt*

STANDARD OIL COMPANY

(INDIANA)

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Do you mention the CONTRACTORS AND ENGINEERS MONTHLY when writing? Please do.

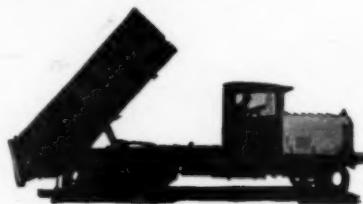
Heavy-Duty Dumping Equipment

Tonnage Distribution That Meets State Law Requirements

DESIGNED to meet the requirements of the California and other state laws as regards dragline, with capacities ranging from $1\frac{1}{2}$ to duty truck with a hydraulic hoist, the latter manufactured by The Heil Co., 1242-60 26th Avenue, Milwaukee, Wis., satisfies these requirements.

An enormous load can be handled with this equipment, the body being 12 feet long, $6\frac{1}{4}$ feet wide, and having a height of 31 inches. It is firmly braced and of strong construction, as is indicated by the fact that the weight of one of the bodies with its subframe is approximately 5,000 pounds. The hoist can easily handle 12 tons of dirt lifting it to a 49-degree angle in 18 seconds.

This equipment is used by J. P. Holland, Inc., of San Francisco, one of the largest dirt movers in



SIX-WHEEL FAGEOL HEAVY DUTY PUMP TRUCK WITH HEIL HYDRAULIC HOIST

California, who is very enthusiastic over the excellent service this equipment is giving him and has three of these Fageols equipped in this manner.

A Shovel-Crane-Dragline

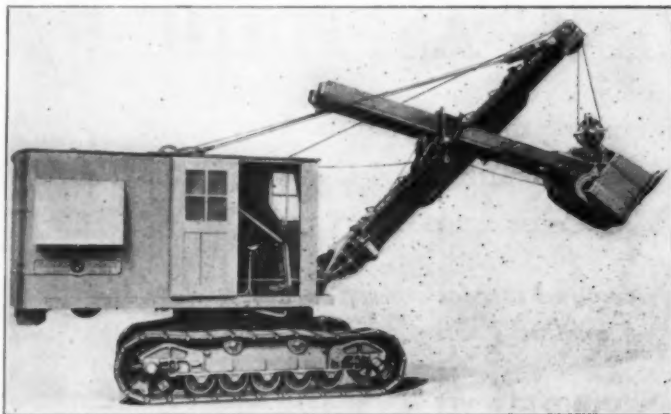
New Features Increase Output and Yield Larger Returns

ANNOUNCEMENT has been made of a new machine, built as either a shovel, crane, or dragline, with capacities ranging from $1\frac{1}{2}$ to 1 cubic yard of material, by the Koehring Co., Milwaukee, Wis.

An innovation in this machine, No. 501, is the

dipper. The boom length is 24 feet in each case.

Other profit-making features designed to increase the output and yield larger returns to the owner, are the shovel-power dipper trip, the special swiveling boom point fairlead for the dragline, cast steel car-body, multiplane girders and side frames, ball



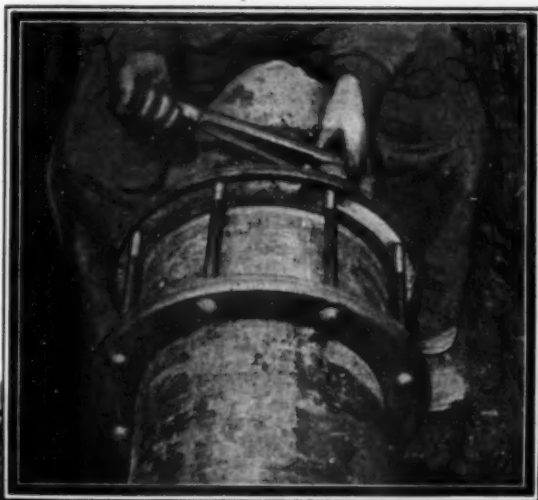
**THE
NEW KOEHRING
NO. 501 SHOVEL,
CRANE AND
DRAGLINE**

method of rating the shovel. The choice of 3 sizes of dippers may be had depending on the length of the dipper sticks and the kind of work for which the machine is to be used. With 13-foot sticks a $1\frac{1}{2}$ cubic yard dipper is furnished; with 16-foot sticks, $1\frac{1}{4}$ and with 19-foot sticks, 1 cubic yard

bearing-mounted high speed shafts and roller bearing-mounted vertical traction and swing shafts. A 4-cylinder 6×7 inch gasoline engine, running at 925 r.p.m., furnishes the power, with an optional choice of electric motor. A smaller machine, with capacities of 1 to $\frac{3}{4}$ cubic yard, is also built.

When the question is "Where to Purchase" consult the Where to Purchase Directory in Contractors and Engineers Monthly. It is complete and accurate

Installation for one of the largest gas companies in the middle west. 12" plain end deLavaud pipe with Dresser type couplings.



The smooth exterior of deLavaud Cast Iron Pipe makes it ideal for use with special couplings



IT has long been a standard practice to use couplings of the Dresser type for high pressure lines.

For water or natural gas lines this joint may be equipped with regular rubber gaskets. For lines conveying manufactured gas, lead tipped gaskets are generally specified.

Write for descriptive literature on special couplings for all purposes

United States Cast Iron Pipe and Foundry Company

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Philadelphia: 1421 Chestnut St.
Chicago: 122 So. Michigan Blvd.
Birmingham: 1st Ave. & 20th St.
Buffalo: 957 East Ferry Street
Cleveland: 1150 E. 26th Street
Minneapolis: 6th St. & Hennepin Ave.

New York: 71 Broadway
San Francisco: 3rd & Market Sts.
Pittsburgh: 6th & Smithfield Sts.
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Burlington, New Jersey

When writing to advertisers please mention the CONTRACTORS AND ENGINEERS MONTHLY—Thank You.

New Double Batch Hopper Loaders

Many Large Contractors Use Them to Save Time and Money

A SPECIAL double batch hopper loader for large contractors has been developed by the George Haiss Manufacturing Co., Inc., 142nd Street and Park Avenue, New York, N. Y. Its efficiency is shown by the fact that some of the biggest paving contractors in Chicago are using it. All of these contractors are using 2-batch trucks for carrying batches to the pavers, and batching at stock piles as near the work as possible. A truck gets two batches of stone, then the cement, and then two batches of sand. The value of the double batch loader over the single is in faster dispatching of the trucks, saving 20 to 30 seconds at the stone and 15 to 20 seconds at the sand, as the truck does not have to wait with one batch on while the second batch is being placed in the hopper.

batches. By a single substitution in the upper truncated pyramid section and the bolting in place in the lower box section of some reducing places, the capacity is changed for sand to two batches of 11 to 16 cubic feet each.

The hopper and its supporting platform can be lowered by a winch on the elevator, and the elevator itself lowered to an overhead clearance of 10½ feet in less than 10 minutes. This means that the loader can be carried on a trailer under a viaduct with 12½-foot or more clearance. The discharge chutes of the hopper have a minimum discharge height of 7 feet, and a reach from the bumper of the loader of 4 feet 10 inches. The clearance under the hopper supporting platform is 7 feet back to the bumper. This reach and clearance make it possible to load with compartments



THE
NEW HAISS
TWO BATCH
LOADER

The double loader does not take the place of two loaders, one in stone and one in sand. It makes two batches of stone, or two batches of sand, available at one time for the double batch truck.

These loaders are standard Haiss loaders, excepting that the creeper mounting is 15 inches longer and the front chassis construction is heavier, to carry the double load, and the hopper has a dividing plate and two outlet gates to discharge the two batches independently.

The hoppers are of the precision type, with micrometer capacity and adjustment and can be provided with strike-off and interlock. The maximum capacity, struck-off, is two 25-cubic-foot batches, and is adjustable to two 18-cubic-foot

over the side or the end as desired. All of the controls are grouped at the operator's platform.

The American Asphalt Paving Co., operating two pavers, has one double loader handling stone for each paver and one single loader handling sand for each. These filled double 25-foot batches of stone, 50 feet in all, in 40 to 50 seconds, a rate of 2 to 2¾ yards per minute. The R. F. Conway Co., operating one paver with a double loader on stone and another make machine on sand, laid over 2,000 square yards 7 inches thick in 8 hours, using a 5-bag batch, 1:2¼:5 mix. These two companies report a gasoline consumption on the double loader of 10 gallons per day, or nearly 40 yards to the gallon which is unusually good, the ordinary yardage being about 20 to the gallon.

Hoist and Body Units That Pay Real Profits

VAN DORN hoist and body units are profit producers because their action is positive and trouble-free because they are built to stand the gaff of hard, continuous service.

Constantly bathed in oil and operating on the worm gear principal the hoist mechanism cannot be surpassed for service. The body itself, while lighter than ordinary truck bodies, has a strength far out of proportion to its weight.

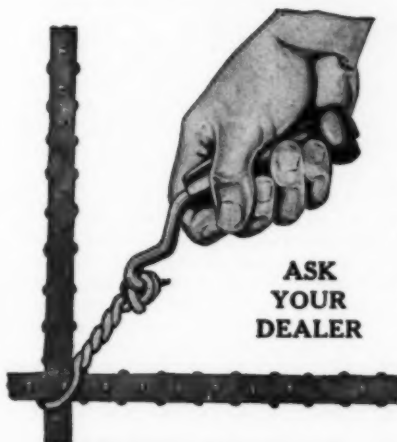
A Van Dorn mechanical hoist plus a Van Dorn body is a combination that means real profits for the operator.

THE VAN DORN IRONWORKS COMPANY
2685 E. 79th Street • Truck Division • Cleveland, Ohio
"More Pay Loads—More Profits"

Van Dorn
MASTERCRAFTSMANSHIP
IN STEEL



CONTRACTORS LABORERS X TIME = DOLLARS



Tying Concrete Reinforcing Bars
with Wire Tie and Tying Tool

BATES WIRE BAR TIES

Will save you time, labor and dollars.

No skilled labor required to use this equipment.

Two or three turns with tying tool and bars are tied.

Ideal to use in cold weather—men do not have to take off their gloves

Manufactured by

BATES VALVE BAG CO.
8200 So. Chicago Ave.
Chicago, Ill.

A Road Grader for Heavy Jobs

Strength and Durability are the Features of This Road-Hog

FOR the contractor, state or county jobs, or anyone who has the hardest and most difficult jobs to do and wants a grader that will stand the work day in and day out, W. A. Riddell Co., Bucyrus, Ohio, has manufactured a "Road Hog" which, they state, has the strength and weight, plus material and workmanship, to stand up under these conditions. It is built for both International and Fordson tractors, the specifications varying in some particulars to meet the needs of the individual power units.

All gears and worms are enclosed in oil and grease tight cases, and worms are mounted on the bottom on ball thrust bearings, and are thoroughly submerged in a bath of transmission oil. The frame members are of I-beam construction, 3

mounted on 34-inch heavy front wheels and roller bearings. The case of the lifting gear is of semi-steel. The worm and gear are machine cut—the worm shafts are integral mounted on ball thrust bearings. The worm is mounted on the bottom of the gear, and run in a bath of transmission oil. The worm gear is pressed and keyed on a 2½-inch diameter shaft. The shaft is squared on each end, allowing the gear to be changed to any quarter, giving four times as much wear. The hand wheels are 28 inches in diameter, with pipe rims welded to wrought iron spokes with built-in brakes to hold the blade in any position.

The scarifier is rigid and strong in construction, and is securely fastened to the head casting. It is operated with a large machine cut worm and



**THE
NEW HADFIELD-
PENFIELD
ONE-MAN ROAD
HOG**

inches wide and weigh 23 pounds per foot. The moldboard is of high carbon steel, 15 inches high, 10 foot standard, with optional length ¼ inch thick with reinforced back. The blade is 6 inches wide and ½ inch thick, of high carbon steel with double cutting edge.

The head-type steering gear is directly over the front axle giving positive steering direct on each front wheel. It has a 24 to 1 reduction, worm and gear, and is machined, hardened and ground. The shafts are integral, eliminating all keys and looseness, are mounted in large bronze bushings and ball thrust bearings adjustable and are enclosed in an oil tight case. Alemite lubrication is used throughout.

The grader has a special heavy steel axle

gear in an oil tight case. The worm is mounted on the bottom of the gear and on all thrust bearings. The worm and shaft are integral and run in transmission oil. The gear is pressed on a 2½-inch diameter shaft. The carbon steel shaft is squared on the ends so that it can be changed to any four wearing positions. The scarifier arm is a steel casting, with five teeth which are tempered and self sharpening, set at the proper angle to make the hardest kind of scarifying an easy operation.

The wheel base is 14 feet, 9 inches. The weight of the grader without the tractor and tracks is approximately 4,200 pounds, and with the tractor and tracks approximately 9,000 pounds with the Fordson and slightly heavier than this with the McCormick-Deering tractor.

*It costs a lot of money to sell goods,
but it costs a lot more not to sell them.*

American Steel & Wire Company's

WIRE FABRIC

"The Steel Backbone for Concrete"



Making City Street and Country Highway Permanent

TO reinforce concrete roads with Wire Fabric makes them permanent and is a proven economy. This fact is conclusively brought out in the report of the Highway Research Board, National Research Council.

Made of cold drawn high tensile strength steel, Wire Fabric has proved itself the perfect slab reinforcement. It gives the most effective distribution of steel—the closely spaced wires insuring greatest binding strength, holding the slab together as a solid unit and preventing the development of cracks.

Wire Fabric means permanent reinforcement—longer concrete life—lower maintenance costs. It is furnished in sheets cut to definite size which are easily handled and placed.

SALES OFFICES

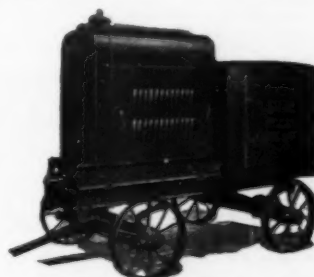
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*Under Order Steel Products Company

YOUR FIRST CONCERN ON THAT ROAD JOB IS WATER

The yardage paved per day depends largely on the water supply—*Speed Means Profits*—therefore you must have a Pump that insures a never-failing supply of water.

The "Domestic" GIANT Pump is your "profit insurance."



"Domestic" 35-A GIANT Road Pump Unit

Special Features of "Domestic" Giant Triplex Road Pumps

HYATT ROLLER BEARINGS on pump drive shaft and pinion gear drive shaft.
DIRT PROOF AND OIL RETAINING pump and gear housings.

PRESSURE OILING SYSTEM. Oil supplied UNDER PRESSURE direct to every bearing.
EXTRA HEAVY CRANK SHAFT, thus removing all dangers of distortion or breakage under maximum loads. Crank shaft is drilled for oil passage to all its bearing surfaces.

GIANT ROAD PUMP UNITS are assembled with 35-HP. 4-cylinder industrial type gasoline engines, and for pumping capacities of 80, 100 and 150 gallons per minute against back pressures of 500, 375 and 225 pounds respectively.

"The Greatest Road Pump Value on the Market"

Domestic Engine & Pump Co.

Shippensburg, Penna.



Put These Catalogs to Work

THE catalogs and pamphlets listed below are available for free distribution. Contractors and Engineers who check over these pages each month and write for such material as interests them, will find this a valuable means of keeping up to date on the subject of machinery and equipment.

WATERPROOF COVERS FOR TRUCKS AND MATERIALS

Write to the Hoosier Tarpaulin & Canvas Goods Co., 1302-6 W. Washington Street, Indianapolis, Ind., for complete information regarding their waterproof tarpaulins and canvas covers in all sizes for trucks, tractors, machines and all equipment and for covering materials for new buildings. These covers are reasonable, durable and absolutely waterproof.

ONE-MAN GRADER WITH INDEPENDENT SCARIFIER

Printed matter describing the Road Hog, a new H-P one-man grader with head type steering gear, counter-balanced blade lift, independent scarifier, and either International or Fordson powered, may be secured from the W. A. Riddell Co., Bucyrus, Ohio.

TRENCH AND SEWER BRACES

Simplex trench and sewer braces that are equipped with the safety unbreakable 3-way nut that is safer than the old style wing nut, more compact and durable, occupies less space and can be easily applied to any standard trench brace to replace broken wing nuts, are manufactured by Templeton, Kenly & Co., Ltd., Chicago, Ill. Write for descriptive bulletin.

ADJUSTABLE METAL SHORES AND COLUMN CLAMPS

Two new products, an all-metal shore that cannot slip, having 2 adjustments, and a column clamp with 2 wedge slots, manufactured by the Concrete Engineering Co., 1141 North 11th St., Omaha, Neb., are described in illustrated circulars which will be sent free on request.

ELEVATORS FOR SAND AND GRAVEL DELIVERY

A 44-page booklet consisting of illustrations, examples, ratings, capacities and tables showing how to select typical elevators for sand, gravel, etc., has been published by the Link-Belt Co., 300 West Pershing Road, Chicago, Ill., which will be glad to send it free to interested contractors and builders.

ADMIXTURES IN CONCRETE

Bulletin 325-B, just issued by the Celite Products Co., 11 Broadway, New York, gives the most up-to-date information on the use of Celite in concrete, including a discussion of its use where the water-cement ratio is specified and includes considerable data of general interest on concrete construction.

SAVING OLD ROOFS

This is the title of a new booklet, issued by the Tropical Paint & Oil Co., Cleveland, Ohio, telling how to save your old roofs, how to renew an old roof, where to look for leaks and how to cure them, patching large holes and repairing old flashings.

A SYSTEM FOR HANDLING BULK MATERIALS

Catalog 95 of the R. H. Beaumont Co., Philadelphia, Pa., describes and illustrates its one-man system for solving the ground storage problem and for stripping, loading, and reclaiming sand, gravel, stone, etc. This will be sent free to interested contractors.

BLUEPRINTS AND SPECIFICATIONS OF CONCRETE MIXERS

The Jaeger Machine Co., 701 Dublin Ave., Columbus, Ohio, has just issued its Bulletin No. 127 which gives blueprints and specifications of Jaeger mixers, 14-S, 21-S and 28-S sizes in heavy duty non-tilt models.

DIGGING FOR PROFIT

This is the title of Bulletin No. 4, issued by the Universal Power Shovel Co., Detroit, Mich. This Bulletin describes the Wilford power shovel with its various attachments and illustrates how it may be used on many different jobs.

A SIMPLE BUT POWERFUL CABLE CROWD

A catalog of the half-yard, full-revolving shovel of the Speeder Machinery Corporation, 1215 So. 6th Street, W., Cedar Rapids, Iowa, will be sent to contractors and engineers. This shovel has a superior crowding action, is simple, powerful and efficient with a one-lever control that is entirely independent of hoist and swing.

CRAWLERS FOR DEEP CUTS AND DITCHING

A special contracting bulletin has been prepared by the Trackson Co., 519 Clinton Street, Milwaukee, Wis. It describes the Trackson full-crawler and gives its advantages over other crawlers. It is especially adapted for contracting work in hard or wet ground, or in building and maintaining roads. Write for this free bulletin.

A CRANE THAT GIVES DEPENDABLE SERVICE

Complete information and illustrations of a crane that is especially designed for handling bulk material, laying rails, and operating pneumatic and electric tools, is given in a circular which The Parsons Co., Newton, Ia., will be glad to send free on request.

MACHINE TO REPLACE HAND-HOEING OF PLASTER

"The Mechanical Hoeman," a new 1-bag mortar and plaster mixer that will handle easily the requirements of from 12 to 14 plasterers or 50 bricklayers, will turn out a thoroughly mixed 4-hod batch of mortar or plaster in two minutes, and is provided with two styles of mounting and equipped with a 2-cylinder LeRoi gasoline engine, is soon to be announced by the Marsh-Capron Co., Chicago, Ill. Write for details and specifications.

A CONTROLLER FOR CONSTRUCTION ELEVATORS

Write to The Electric Controller & Mfg. Co., Cleveland, Ohio, for a special bulletin describing its Dinkley controller for controlling the hoist motor of construction elevators, built for high speed, continuous operation and that will stand up under severe operation and adverse working conditions.

SELF-PROPELLED PORTABLE STONE CRUSHERS

Bulletin 127, issued by the Acme Road Machinery Co., Inc., Frankfort, N. Y., completely describes Acme self-propelled portable stone crushers which are equipped with a single power plant that moves the crusher to the job and operates it.

FOUR-CYLINDER MOTOR ROLLERS

Literature fully describing Huber motor rollers in four sizes, 5, 7, 10 and 12 tons, which have no vibration, no shifting of gears, plenty of speed, clear vision and economy, may be secured without obligation by writing to the Huber Mfg. Co., 308 Center Street, Marion, Ohio.

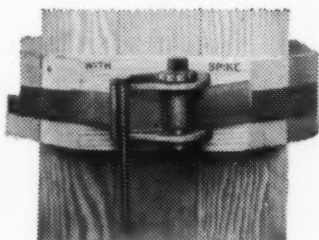
MIXERS FOR PLASTER AND MORTAR

Literature describing M-B mixers for plaster and mortar, which give a better and more thorough mix and are easy to clean, sturdy and simple in construction, may be secured from the Meli-Blumberg Co., Inc., New Holstein, Wis.

BARROWS, CARTS AND SCRAPERS FOR EVERY PURPOSE

Bull Frog barrows, carts and scrapers for every construction purpose, including the Bull Frog No. 64 which has many advantages, including perfect balance, shaped handles, ease in running and ease in dumping, are described in a catalog which may be secured without obligation from the Toledo Wheelbarrow Co., Toledo, Ohio.

Clamps



- Easy to put on—
- Easy to take off—
- Easy to carry—
- Easy to store when not in use—
- Easily placed by two men at the rate of one a minute—
- Adaptable to all types of columns—
- Amplly strong to insure a tight form under all conditions—

If you are interested in saving hundreds of "man hours" on concrete column work, write for the W. A. K. circular.

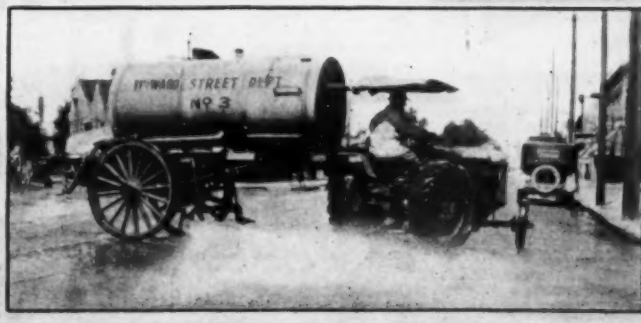
W.A. Kuhlman & Co.
Toledo, Ohio

TRAIL-IT

SEMI-TRAILER-TRACTOR HITCH

Motorizes Horse-Drawn Equipment
and
REDUCES HAULAGE COSTS

The TRAIL-IT Hitch is used by many Trailer and Wagon manufacturers as standard equipment.



**DIRT MOVERS
STREET
DEPARTMENTS
HAULAGE
CONTRACTORS**

**We can SAVE
you MONEY**

**TRAIL-IT
COMPANY**

2516 Wabash Ave.,
St. Paul, Minn.

CHLORINATED WATER FOR CONTRACTORS

Contractors interested in chlorination of water for construction camps to prevent outbreaks of water-borne disease should secure the literature of Wallace & Tiernan, Inc., Newark, N. J., telling why all drinking water should be chlorinated.

DEPENDABLE POWER UNITS

The Industrial Equipment Division, Waukesha Motor Co., Waukesha, Wis., will be pleased to send interesting literature describing and illustrating Waukesha Ricardo head engines which are standard equipment on many pieces of contracting equipment.

BLOCKS FOR MANILA OR WIRE ROPE

Catalog C. E., issued by the Western Block Co., Lockport, N. Y., describes this company's line of Anvil brand blocks for manila or wire rope in all standard styles and sizes.

ENGINES, LOG SAWS AND PUMPS

A complete catalog describing Witte pumps, all-fuel engines, and log saws, may be secured without obligation from the Witte Engine Works, 3016 Witte Building, Kansas City, Mo.

ALUMINUM RULES FOR ENGINEERS AND CONTRACTORS

Literature describing Lufkin aluminum rules divided in tenths and hundredths of feet for civil engineers, surveyors, highway builders, tile layers and others and which are accurate, light weight, durable, rust proof and furnished with or without folding end hook, may be secured from the Lufkin Rule Co., Saginaw, Mich.

THREE SPEED HOISTS

The new Mundy hoist which has both power and speed and in which three separate and distinct speeds may be instantly called into use by the mere shifting of a lever, is described in literature which may be secured from the Mundy Sales Corp., 30 Church Street, New York.

HIGH CARBON CONCRETE CHUTES

Ransome steel and wooden towers, hoist buckets and high carbon steel chutes for concrete work as well as Ransome 30-8 towers, are all manufactured by the Ransome Concrete Machinery Co., Dunellen, N. J., from whom complete information and prices on this dependable equipment may be secured.

MIXERS FOR CONCRETE, MORTAR OR PLASTER

Full particulars regarding the Standard mixer with which you can mix your plaster with the same efficiency as concrete or mortar because of the all-steel narrow drum construction, may be secured from the Standard Scale & Supply Corp., Pittsburgh, Pa.

CENTER DRIVE SHOVELS

The center drive steam, gasoline or electric shovels, cranes and draglines which give faster work, freedom from breakdown delays and greater profits, are described in literature which may be secured from the Thew Shovel Co., Lorain, Ohio.

TABLES AND INFORMATION ON ROAD SURFACING

Contractors interested in maintaining earth, sand, clay, gravel, macadam, shell, cinder and similar road surfaces, should secure a copy of a new booklet "Texaco Road Surfacing Materials" from the Texas Co., Asphalt Sales Dept., 17 Battery Place, New York. This booklet also contains a series of useful tables for the road builder.

MIXERS OF STURDY CONSTRUCTION

The Atlas Engineering Co., 8036 Galena St., Milwaukee, Wis., manufacturers of Atlas 3½-foot, ¼-bag, 1-bag and 2-bag mixers, which are of sturdy dependable construction, will be pleased to send literature and prices to interested contractors.

TRACTORS FOR ROAD BUILDING

Caterpillar tractors which keep down road building costs and pull the biggest, stoutest equipment the market affords, are described in literature which may be secured from the Caterpillar Tractor Co., San Leandro, Calif.

GAS OR ELECTRIC TRENCHERS

Complete information and prices regarding the General trencher which can be easily changed to a shovel, crane, clamshell or dragline without changes or additions in operating machinery may be secured from the General Excavator Co., Marion, Ohio.

STEEL CHUTING EQUIPMENT FOR CONCRETE

The Insley Manufacturing Co., Indianapolis, Ind., will be pleased to send information and prices on Insley mast hoists and chutes and the savings which may be effected through their use in concrete placing.

A MIXER WITH SPIRAL SHOVEL SYSTEM

For mixing concrete, plaster and mortar the Blystone Mfg. Co., 826 C Street, Cambridge Springs, Pa., has produced a mixer with a patented reverse spiral shovel system that insures 100 per cent thoroughness and that uses 30 to 40 per cent more sand than when mixing by hand. It is described in a free catalog.

DEPENDABLE CONCRETE MIXERS

Catalog 526 describes tilting and non-tilting concrete mixers that are tough, durable, economical and long lived because the smooth end-to-center action is easy on the drum. This catalog is free on request to The T. L. Smith Co., Milwaukee, Wis.

FRESNOS, STONE SPREADERS, SCRAPERS, ETC.

A 96-page catalog has been issued by The Gallion Iron Works & Mfg. Co., Gallion, Ohio, which describes and illustrates not only their newest developments in rollers and graders but also a line of their contractors' equipment, including fresnos, stone spreaders, wheel and slip scrapers, unloading equipment, tank and sprinkling wagons, etc.

LARGE FITTINGS AND SPECIAL CASTINGS

Write to the United States Cast Iron Pipe & Foundry Co., Burlington, N. J., for information and illustrations of its large standard fittings and special castings which are available through unusual facilities in its various plants to meet unusual conditions, thereby saving cost and lessening delivery time.

NEW DITCHING RECORDS

New ditching records, interesting pictures and cost figures are included in "Ditching Snapshots and Records," a booklet of the Barber-Greene Co., 485 W. Park Avenue, Aurora, Ill., which describes ditchers with the vertical digging boom and overload release. A copy of this booklet is free on request.

REVOLVING TRACTOR SCRAPERS

A revolving tractor "Groundhog" scraper that handles the dirt faster, moves four loads for every three by an ordinary scraper, because it loads, spreads and dumps continuously under forward draft, has no stopping, no backing, no lost time or motion, is described in literature of The Roderick Loan Co., Mansfield, Ohio, which will be sent free on request.

A REALLY DRY AGENT

For sand excavating jobs, the duplex plunger trench pump of The Barnes Mfg. Co., Mansfield, Ohio, eliminates the use of sheet piling, effects greater economy and faster progress, is simple and rugged in design with easy accessibility of all working parts, is self priming and built for 24-hour-a-day duty. Write for catalog.

A HEAVY-DUTY OIL BURNING KETTLE

An oil burning melting kettle, Type 83, in 300 to 550 gallons capacity, that produces hot materials in large batches in a fraction of the time usually required, that is simple to operate, has all-steel wheels, large oil reservoir and full-turning fifth wheel, is described in a catalog of Littleford Brothers, 485 East Pearl Street, Cincinnati, Ohio.

STEAM-JACKETED PIPE, FITTINGS AND PUMPS

The Iroquois system of steam-jacketed pipe, fittings and pumps for pumping asphalt and other viscous materials that will not flow at atmospheric temperatures, that is quick, safe and economical, is described in literature of The Barber Asphalt Co., Philadelphia, Pa.

EFFICIENT WIRE BAR TIES

Write to the Bates Valve Bag Co., 8200 So. Chicago Avenue, Chicago, Ill., for particulars of its wire bar ties that save time, labor and dollars, that are ideal to use in cold weather, and that require no skilled labor to use.

ROAD ROOTERS, TRAIL GRADERS AND TEST TEMPLATES

Literature of Ted Carr & Co., 939 West North Avenue, Chicago, Ill., describes and illustrates their line of road rooters, trail graders and test templates. Write for this literature which is free to interested contractors and engineers.

POWER UNITS FOR VARIOUS SERVICES

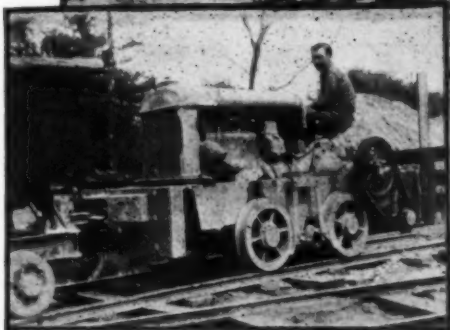
Write for a bulletin on the special service of power units in which you are interested to Climax Engineering Co., Clinton, Iowa. This will describe and illustrate the engines applicable to this service, and will be sent free on request.

DUMP BODIES FOR ECONOMICAL TRANSPORTATION

Rollover bodies in sizes of 1 yard and up, and which state highway departments, roadbuilders, central mixing-plants and many others have found a most economical means for transporting wet mix, dry batch or other loose flowing materials are described in literature of the Easton Car & Construction Co., Easton, Pa.

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Highway trailers in 2-, 4-, 6- and 8-wheel types, in ½- to 50-ton capacities for use with shovels, cranes, rollers, trenchers, pavers, mixers and compressors for hauling cement, sand, gravel, stone, lumber, steel, pipe, etc., are described in bulletins of the Highway Trailer Co., 503 Fulton Street, Edgerton, Wis., which will be sent free on request.



2 of the 10 Brookville-Fordson Locomotives owned by The Necaro Co.

10 BROOKVILLES

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THE NECARO CO.

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Seven 4-ton "FCR" with three speed reverse on one job—a sewer contract at Jamaica, L. I.

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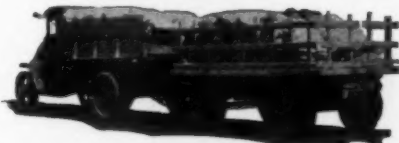
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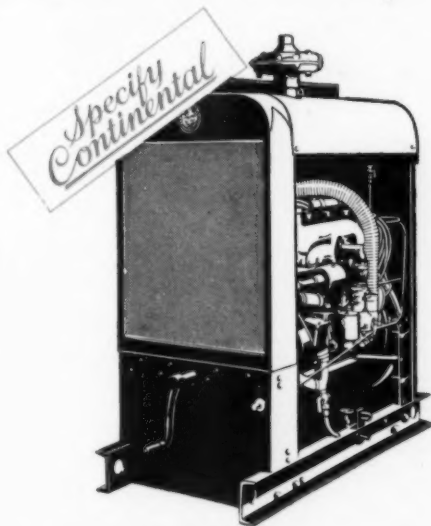
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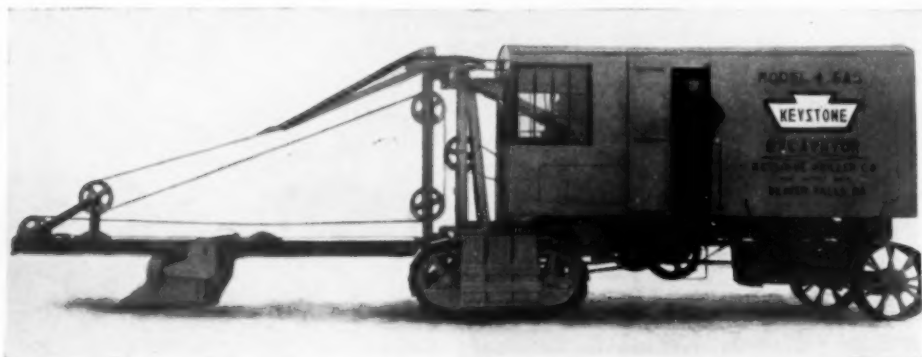
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9-D-44



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*We'd like to send
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covering this ma-
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Dictate a note for
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The laborers themselves like the wheelbarrows mainly because of the wheel.

Then too, the tray brace which is now of rigid construction is such that absolutely prevents the tray, no matter how heavily loaded, from sagging and dragging on the wheel. The laborers like this very much also.

We have been using Sterling Wheelbarrows for years and so long as they give us the same service as they do now and the men keep asking for them, we will continue to use them.

Very truly yours,

McCORMACK-COMBS CONSTRUCTION COMPANY

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A Scientifically Designed Front Brace Formed V Shape Holds the Tray in Shape and Strengthens the Frame. It is This Attention to Details Which Makes a Barrow Better and Cheaper in Performance.

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down
crushed
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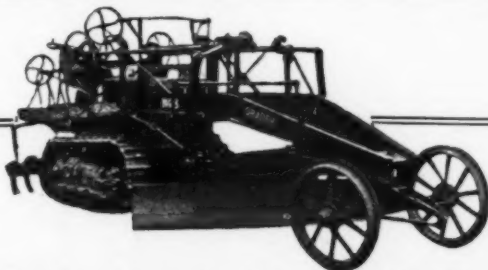
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Equipped with Road Wheels for high-speed maintenance or Crawler Treads for heavy-duty grading—furnished for the following Tractors—

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JOHN DEERE and FORDSON

A complete standard 8-ft. grader unit with 8-ft. blade, front or rear scarifier and with all standard controls, including blade reverse, operated from driver's platform in the rear.

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The use
of CAREY ELASTITE EXPANSION
JOINT is advocated by leading
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because:

—it absorbs expansion and contraction, prevents over-stresses in the structure, protects concrete against breakage, and extends its length of service.

—it will not melt in hot weather, nor will it become brittle in winter. It lasts as long as the concrete.

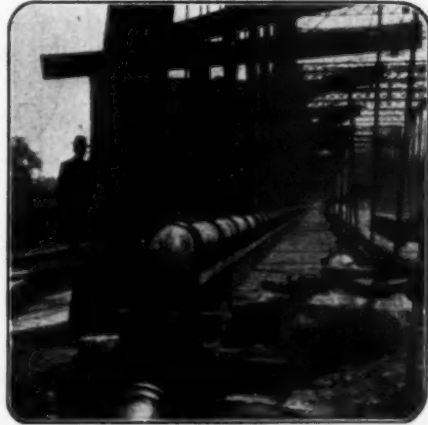
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CAREY Elastite Expansion Joint consists of a heavy body of fibrous asphaltic compound between two substantial layers of asphalt-saturated felt. Made in preformed strips, in widths, lengths, and thicknesses as desired. Have us give you full particulars.

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1. You save the cost of wide trenches.
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The hub and spigot ends of Universal Pipe, machine-tapered at slightly different angles, are drawn into direct contact forming flexible iron-to-iron joints that provide for expansion and contraction, vibration and uneven ground settlement.

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The ORD Concrete Road Finisher has become so popular that a network of good roads covers practically every state. Through mountain passes, over sun-baked desert sands, the ORD works faithfully day in and day out. On level stretches, around curves and up grades it never fails to turn out good roads; the kind that makes the contractor's heart glad and swells his purse—and wins approval from the most particular inspector. Can you beat this for performance?

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Write us for sketches showing type of joint furnished.

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Equipped with the Safety
Unbreakable 3-Way Nut



The Simplex 3-way nut is safer than the old-style wing nut—more compact and durable—occupies less space and can be used more readily in close quarters.

Can be easily applied to any standard trench brace to replace broken wing nuts.

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Free Catalog

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The Famous Boss 100, a Specially Sized Mixer for Any Job. Mixes one bag and proportion or two bags 1 1/2 to 2 cu. yd. Extremely compact. Weighs No More—Costs No More than some one baggers. BOSS Patented Rapid Discharging and Reversing Action gives 25 to 30 more batches per day. Steel or rubber tired wheels. With Concrete Trucks converts into silo paver. Write for catalog.

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Branch Offices and Warehouses in All Principal Cities.

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Our catalog of special interest to all road builders—sent free and postpaid.

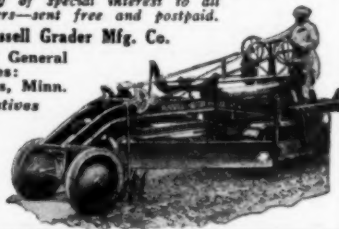
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Offices: Minneapolis, Minn.

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MIGHTY IMPORTANT
is the road grader. It can, in one way or another, actually represent a source through which money can be saved or squandered by the road-builder. Rome Graders have proved their eligibility as a source of economy. Their rugged simplicity—time- and labor-saving high lift—indestructible disc wheels—Timken roller bearings—are some of the more important reasons why. If you are interested in the maintaining or building of roads, you will be interested in the Rome.

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All Types and Sizes
With or without Scarifier
attachment.

Helps you finish the job
on time.



Send for catalog A for complete information.



The Buffalo Springfield Roller Co.
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Illustration shows the BERG Universal (Direct Connected) Model. Also made in BERG Regular Model and the BERG Air-Driven Model.

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Surfaces and finishes concrete construction better, quicker and cheaper than any other method. Unequaled for distinctive results obtained.

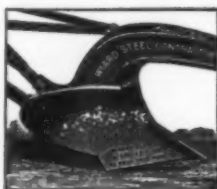
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Combination Rooter and Furrow Plow



The beam is amply strong to carry the plow bottom through any condition where otherwise a rooter would be necessary.

WIARD PLOW COMPANY
BATAVIA, N. Y.

PLOWS

Does Double Duty

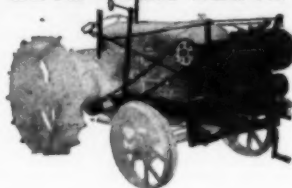
Production speeded up—time saved—extra men cut off the pay roll. These things of themselves commend Porta-Hoist to the prudent contractor. And when you stop to think that its powering tractor not only makes Porta-Hoist self-portable, but also furnishes power for many belt and drawbar operations, its economy as compared with a stationary hoist is self-evident.

Write for bulletins describing applications for this rugged yet wonderfully flexible hoist.

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PORTA-HOIST CUTS YOUR COSTS



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The graphite is the vital element, for it imparts to bearing surfaces a remarkable smoothness that relieves the grease of a very considerable portion of its task of keeping metallic bearing surfaces apart and takes upon itself the wear which would be borne by the metal. The flake graphite increases both the efficiency and endurance of the lubricant.

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It possesses a remarkable adhesiveness and cannot be washed off, even by running water, sea water, or alkaline and sulphuric mine water. It cannot gum or become rancid. As a rust preventive it is unsurpassed.

Write for Circular 148-W.

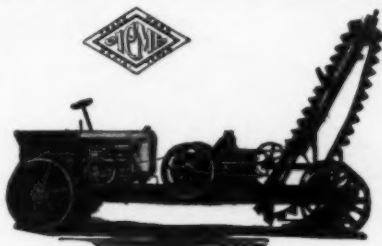
JOSEPH DIXON CRUCIBLE CO.

Jersey City



New Jersey

1827 — One Hundredth Anniversary — 1927



The Acme Self-Propelled Portable Crusher

THIS Acme unit moves to the job under the same power that operates stone crusher, elevator and screen.

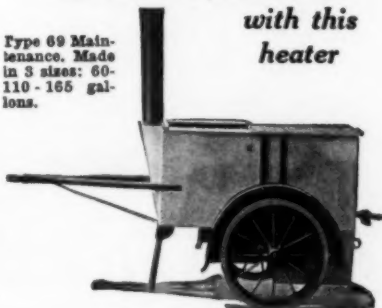
An ideal portable plant for cleaning roadside of unsightly stone piles by converting them into material for highways. Used successfully by contractors and municipalities. Write for Bulletin 127.

Acme Road Machinery Co., Inc.
Frankfort, N. Y.

FASTER WORK BETTER REPAIRS

*with this
heater*

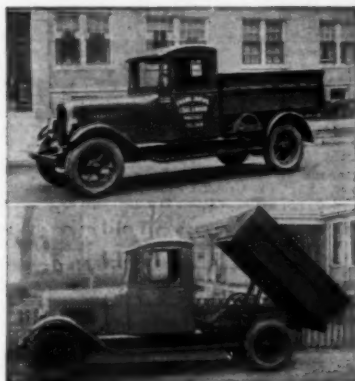
Type 69 Maintenance. Made in 3 sizes: 60-110-165 gallons.



Eliminate the waiting for hot materials by using this fast-heating wood- or coal-burning kettle. Quality built throughout; all-welded kettle; superior roller-bearing spring cushioned running gear with rubber-tired wheels and barrel hoist optional.

Write today for details

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485 East Pearl Street
Cincinnati, Ohio



HEIL-GMC LIGHT DUTY DUMP UNIT

With the announcement of the new G. M. C. Model T-20 1-ton light duty speed truck, general contractors, road builders, and truck dealers have been quick to see the advantage in mounting this chassis with Heil Dump Unit Model 92. The body, which is motivated by a Heil Hand Hoist is equipped with full length hinged sides to facilitate hand loading, double-acting tailgate with manual control and sliding door. High dumping angle, low mounting, good ground clearance, and easy operation are commendable features of this equipment. Model 92 is made in 7-ft. and 8-ft. lengths, 4 feet wide and 26 inches high. Your truck may be delivered direct from the G. M. C. factory to our Detroit factory branch for mounting, or the equipment may be installed at any of our branches.

Write for Bulletin No. 161.

THE HEIL Co.

1243 26th Ave., Milwaukee, Wis.

Branches at Chicago, Philadelphia, Boston, New York, Detroit, Cleveland

We also manufacture a complete line of Hydraulic Hoists, Mechanical Hoists, and Steel Dump Bodies for heavy duty service on every make and model of truck.

Repeat Orders Prove Superiority

McKeown Bros. use several Wodacks in sawing their tough 4x12 long leaf yellow pine for roof trusses. Turner Construction Co. are using 6 Wodacks, 3 of them at present on the Western Electric job in Chicago sawing $\frac{1}{4}$ " form panels and 8x8 braces. Brown-Harry Co. of Gastonia, N. C., tried other saws and then bought 3 Wodacks—one at a time. Great Lakes Construction Co. now use 5 Wodacks on the \$3,000,000 County Jail, Chicago. T. F. Forschner Contracting Co. are now using 5 Wodacks on Chicago's \$5,000,000 Sewage Disposal Plant.

The Wodack is the lightest electric hand saw on the market with 4-inch cutting capacity. Factories buy it to trim boxes and crates. Builders trim roofs and cut light $\frac{1}{4}$ " sheathing AND—most important, the Wodack stands up under heavy work.

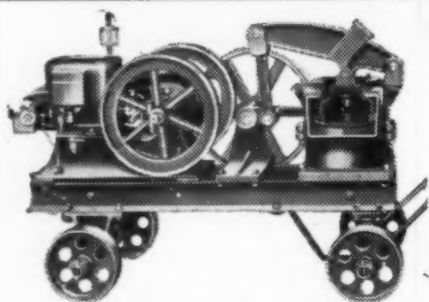
Anyone can operate a Wodack. Follows the line easily. Special Saw Dust Blower. SAFETY GUARD. 11" and 8" Diameter Blades furnished. G. E. Universal motor. Attaches to nearest light socket. Weight only 24 lbs.



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Write for name of nearest
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WITTE PUMPERS

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$\frac{1}{2}$ - to 30-Horsepower

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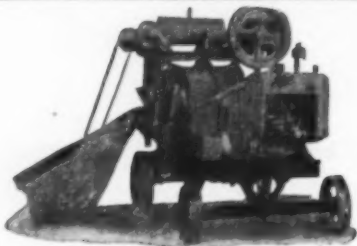
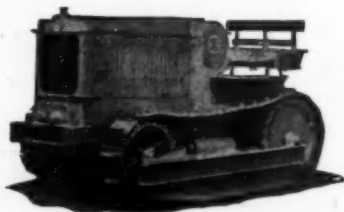
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Ask any JT Operator

The JT Tractor Company

Cleveland, Ohio

40 H. P. Five Ton



Atlas YARDAGE

120 to 150 cubic yards in 10 hours with an Atlas one-bag Mixer.

Atlas Mixers are of sturdy dependable construction and the 7-S is regularly equipped with multiple-cylinder LeRoi Engine, giving excess power.

We build 3½-foot, ¾-bag, 1-bag and 2-bag Mixers.

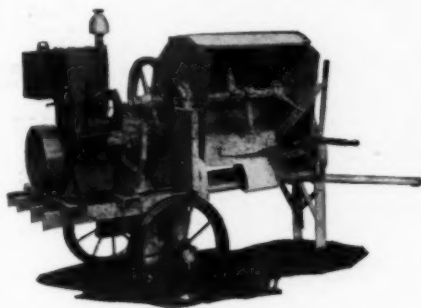
Dealers write for agency proposition

ATLAS ENGINEERING COMPANY

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BLYSTONE

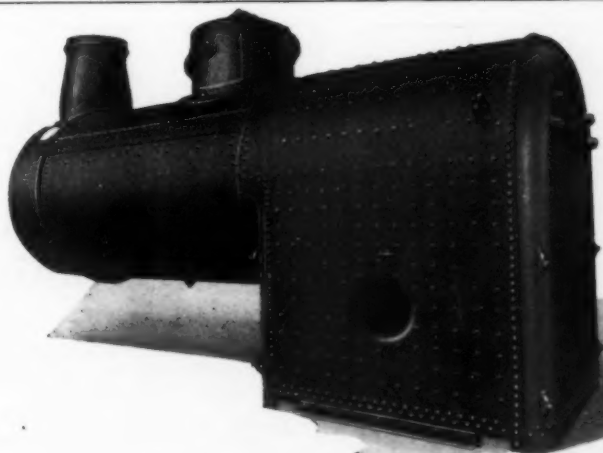
BLYSTONE THOROUGHNESS IN MIXING is due to the spiral arrangement of its shovels. These shovels carry the materials from one end of the drum to the other twice in every revolution of the shaft, or 50 times each minute! This insures a more thorough mix than is possible by any other method.

Have you written for the Blystone circular yet? Write today for more facts about this remarkable **COST-CUTTER ON MIXING JOBS.**

BLYSTONE MFG. COMPANY

927 C Street

Cambridge Springs, Pa.



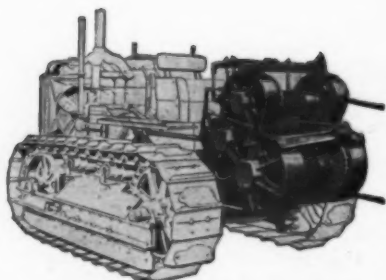
Have you a boiler problem?

JOHNSTON BROS., Inc.

Specializing in Boilers for Contractors' Equipment

FERRYSBURG, MICHIGAN

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Rugged Power plus Mobility

At last rugged power and mobility combined. Mounted on a Caterpillar "60" tractor, this big double drum, two-speed hoist will go anywhere. Ideal for chunking out right of way, operating drag line scraper, pile driving and many other uses.

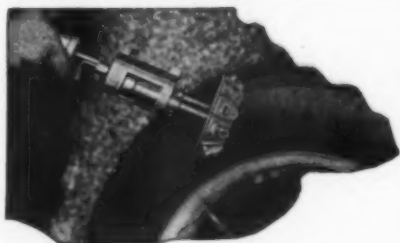
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Dealers Everywhere

Willamette

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ALLISON FOR THE FORDSON WILLAMETTE FOR THE CATERPILLAR



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But you might just as well give them away as to let them go unbranded.

Thieves walk off with them almost at will, and other people think nothing of switching tires with a city-owned car—a deal in which the city always loses.

An Everhot Tire Branding Outfit will stop these losses.

Write today for full details and prices

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No
Water
Gets
Between
These
Slabs

SEALTIGHT *The Perfected Joint*

prevents the entrance of water, sand and pebbles or other foreign matter into the expansion gaps between two slabs of concrete.

Sealtight adheres to the sides of the slabs, sealing the joint perfectly. And Sealtight stays in the joint—does not run out at the top where traffic will carry it away.

Sealtight is made of a mixture of high-grade pure blown petroleum asphalt, specially blended for this product, and a long, flexible, vegetable fibre filler. With this unusually tough fibre Sealtight is reinforced throughout and requires no reinforced sides.

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—Use "Sealtight"*

W. R. MEADOWS, INC.
ELGIN, ILLINOIS



"Clings to Metal"

A Densified Pennsylvania Oil

FOR

Displacing old-fashioned and inefficient cup greases and gear compounds.

"D-A" Lubricant

is especially adapted for use on heavy duty machinery and is sold by distributors of this type of equipment everywhere.

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A W&K One-Ton Fordson Crane is a good solution.

Made in two sizes with 7- and 12-foot lift. Write for illustrated booklet.

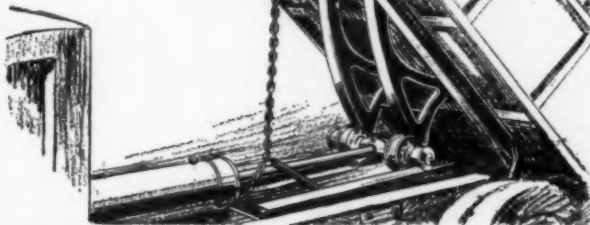
Whitehead & Kales
Detroit Mich Co



Engineers, Contractors and Public Officials are pretty well agreed that the simplicity of construction coupled with satisfactory performance and service—"Until the Last Load is Dumped" has created for Wood equipment its well earned leadership.

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"Until the Last Load is dumped"



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World's Largest Builder of Truck Dumping Equipment
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How do you move earth?

Have you tried the SCHAEFER way? Thousands prefer it because it is so easy to control all four operations (loading, dumping, spreading and leveling) without moving from the driver's seat; and because the SCHAEFER SCRAPER is safe, strong and economical.

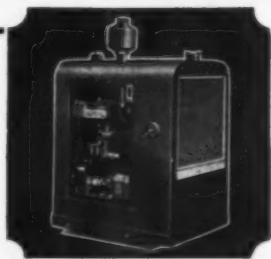
Have you sent for our illustrated circular?

The Gustav Schaefer Wagon Co.

4180 LORAIN AVENUE

CLEVELAND, O.

On Timkens



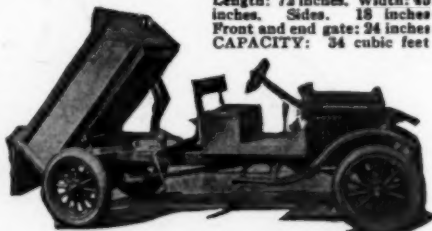
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Length: 72 inches. Width: 45 inches. Sides: 18 inches. Front and end gate: 24 inches. CAPACITY: 34 cubic feet



Here it is—the real producer that never balks. It's durable and dependable. Marion bodies can be used with hand hoist or as an automatic type.

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Hilldale, Michigan

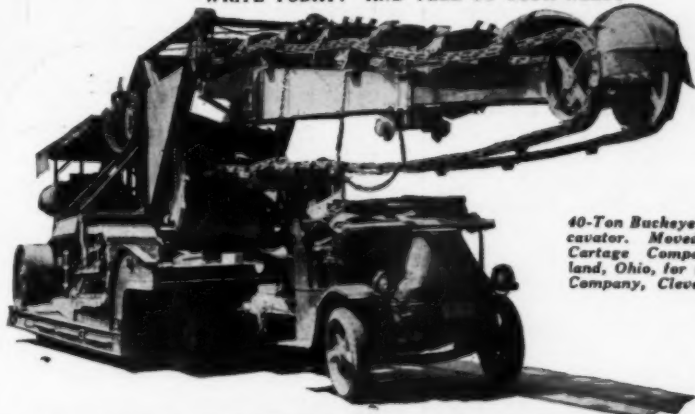
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The strong man handles enormous weights. Endowed with great strength he must ever be ready to resist unusual strains. Like a strong man, Rogers Heavy Duty Gooseneck Trailers handle enormous weights. Reinforced at every point to insure maximum strength, they too, resist unusual

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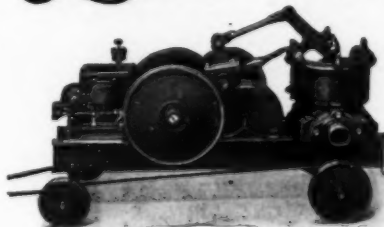
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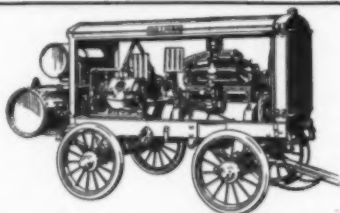
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Write for Catalog 3983-F.

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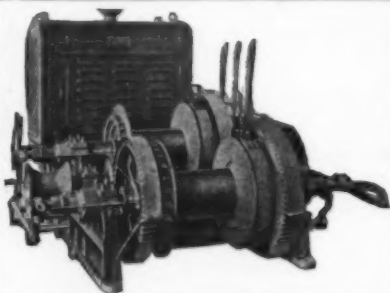
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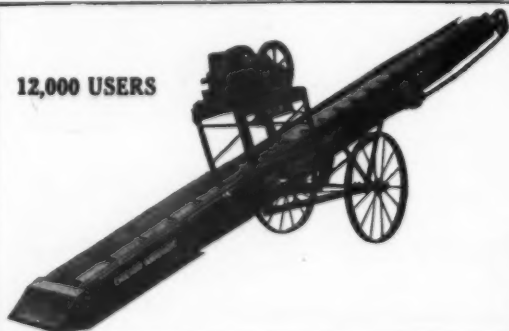
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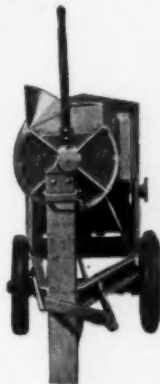
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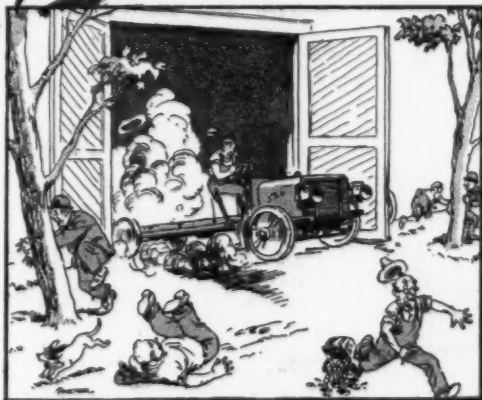
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IT was one memorable Saturday afternoon when the first complete job was ready. Expert drivers were scarce, so volunteering was again in order. The elected one mounted the driver's seat, tested out the odd shaped levers; the engine was started and the vibrating curiosity stood poised for action. With the dropping in of the clutch, the "Exploding Go Cart" leaped into the great outdoors, darted across the street and sped down a long narrow alleyway. While on this straight course the driver partially recovered his faculties but when the time came for putting over the helm to starboard, his reckoning proved faulty, the vehicle veered across the intersecting street at an angle and ended up by colliding with a huge iron fence.

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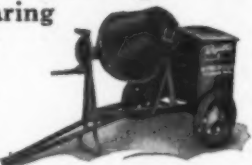
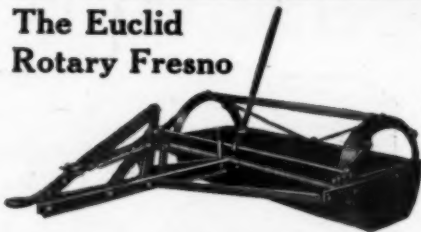
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Rotary Fresno**Outstanding Euclid Features:****Capacity Durability Ease of Operation**

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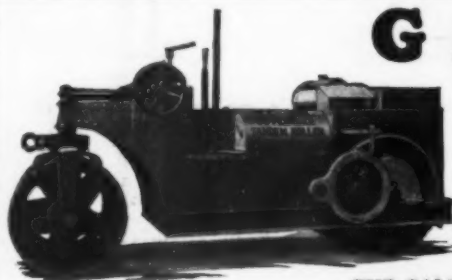
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The Galion line also includes steam tandems in the same weights if you prefer them.

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Used on smaller columns the amount of projection is negligible, diminishing gradually until at the eighteen inch column it disappears.

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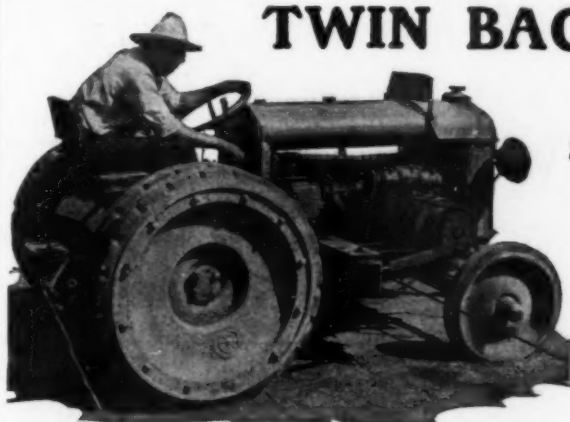
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The KINNEY Heater and Distributor

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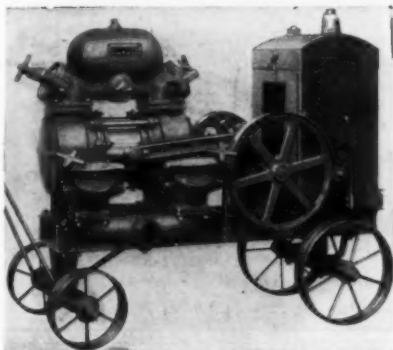
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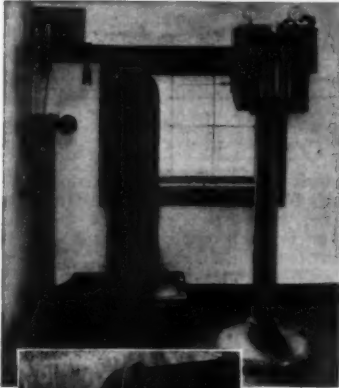
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443 FOURTH AVE.,

NEW YORK

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ELIZABETH,
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W & T
CHLORINATOR
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every drop of
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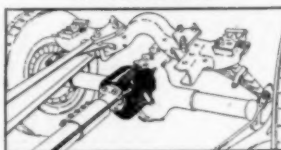
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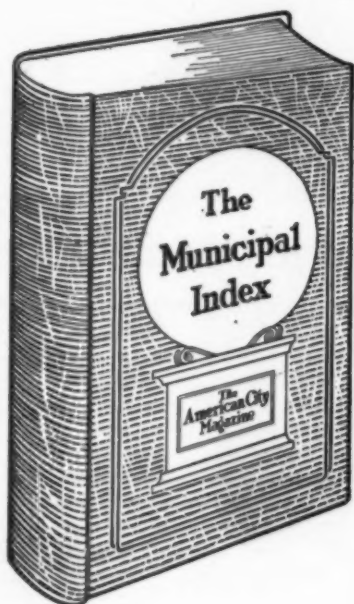
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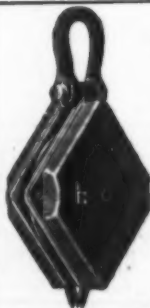
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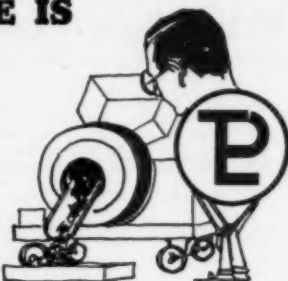
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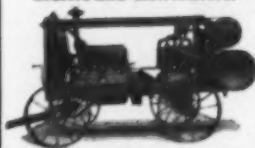
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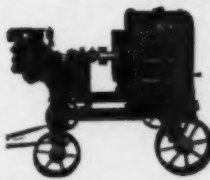
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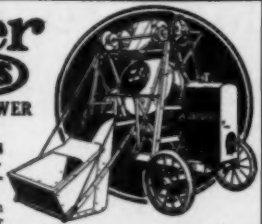
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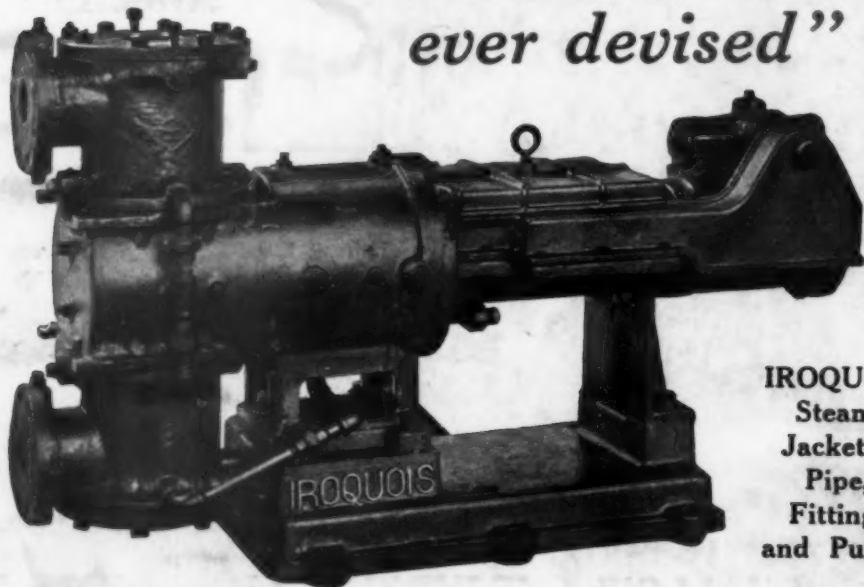
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